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Multi Skill Curriculum
NSQF L3-L4

Job Title
Multi Skill Technician (Electrical)

Job Roles Covered
Electrician, Home Appliances Technician, LED Light repair, UPS/Inverter Field



Developed by
Rashtriya Madhyamik Shiksha Abhiyaan (Maharashtra)

Maharashtra State Board of Secondary & Higher Secondary Education

In Collaboration with
PSS Central Institute of Vocational Education (PSSCIVE) Bhopal

Course: Multi-Skill Technician (Electrical)

Job Role Covered - Other Home Appliances Technician, LED Light repair, UPS/Inverter Field Technician

NSQF Multi-Skill Technician- Level 3 - Class 11th Curriculum

Unit Code	Unit Title	Approved Qualification Pack (Electronics SSC)	NOS	Duration
L3- MST-ET- 1	**Basic Electrical and Electronics**		Covered in Technical Knowledge section of NOSs	50 hours
L3- MST-ET- 2	**Wiring layout (Plan and Perform basic house wiring System, Install tubelight, bulb, switches)**		Covered in Technical Knowledge section of UPS Repair NOS	35 hours
L3- MST-ET- 3	**LED Light Repair**	ELE/Q9302 LED Light Repair Technician	ELE/N9302 Diagnose and repair fault in LED Light	15 hours
L3- MST-ET- 4	**Electrical Home Appliances - I (Iron, Heater, Geyser, Toaster, Rice cooker, Kettle, Mixer, Juicer, Grinder)**	ELE/Q3104 Other Home Appliances Technician	ELE/N3120 Repair dysfunctional mixer/juicer/grinder No NOS available for Iron, Heater, Geyser, Toaster, Rice Cooker, Kettle	200 hours
L3- MST-ET- 5	**Entrepreneurship Development - I**		Should be included in the module. No NOS available	Not a stand alone module. Part of each relevant unit.
				Total: 300 hours

NSQF Multi-Skill Technician- Level 4 - Class 12th Curriculum

Unit Code	Unit Title	Approved Qualification Pack (Electronics SSC)	NOS	
L4- MST-ET- 1	**E-waste**	ELE/Q9302 LED Light Repair Technician	ELE/N9921 Follow safety standards	20 hours
L4- MST-ET- 2	**Electrical Home Appliances - II (Fan, Cooler, Microwave Oven, Semi-automatic Washing Machine)**	1. ELE/Q3104 Other Home Appliances Technician 2. ELE/Q3101 Field Technician – Washing machine	1. ELE/N3121 Repair dysfunctional microwave oven 2. ELE/N3110 Install the washing machine 3. ELE/N3111 Repair dysfunctional washing machine No NOS available for Fan and Cooler	220 hours
L4- MST-ET- 3	**UPS and Inverter**	ELE/Q7201 - Field Technician: UPS and Inverter	1. ELE/N0061 Understand requirement of customer 2. ELE/N7201 Install the UPS/Inverter 3. ELE/N7202 Repair dysfunctional UPS/Inverter	60 hours
L4- MST-ET- 4	**Entrepreneurship Development - II**		Should be included in the module. No NOS available	Not a stand alone module. Part of each relevant unit.
				Total: 300 hours

NSQF Multi-Skill Technician- Level 3 - Class 11th - Curriculum

Unit Code	Unit Title	Learning Outcome	Knowledge Evaluation	Performance Evaluation
L3-MST-ET-1	**Basic Electrical and Electronics**	Demonstrate the basic electric fundamentals	Describe the fundamentals of electricity such as ohms law, difference between ac and dc, calculation of energy consumption of appliances, understanding of series and parallel connections	Demonstrate the knowledge of ohms law, difference between ac and dc, calculation of energy consumption of appliances, understanding of series and parallel connections
		Demonstrate the basic components	Describe the working principle of transformer - Describe the various components and their specifications - functioning of motors, circuit breakers, etc.	Demonstrate the testing of transformer continuity, insulation and voltage ratio
		Demonstrate the knowledge of basic electronics	Describe the function and types of diode, transformer, LED, photo transistor, capacitor, resistor, inductor, thermistor, ICs	Identify the components - diode, transformer, LED, photo transistor, capacitor, resistor, inductor, thermistor, ICs
L3-MST-ET-2	**Wiring Layout**	Plan and Perform basic house wiring System, Install tubelight, bulb, switches	Identify materials used in electrical wiring - Describe the various types of diagrams used in wiring system: wiring diagram, circuit diagram, schematic diagram and their advantages and disadvantages - Describe the different types of trunking and conduit in electrical installation: straight joint, end, t-joint, L-joint, L-joint straight. - describe installation of tubelight, bulbs, switches	Read wiring diagram, circuit diagram, schematic diagram - Demonstrate the knowledge of applying electrical symbols and diagram in house plan - Identify the basic electrical symbols used in house plan - Apply procedures for cutting trunking, bending PVC conduit/metal conduit - Apply techniques for trunking and conduit: plan the route of the main circuit and drill and fix the main body of the circuits - install tubelights, bulbs, switches
	Installation and maintenance of protective devices	Demonstrate the knowledge of protective devices and earthing	Describe the different types of uses - eye breaking capacity fuses : advantages and disadvantages - Describe the applications of fuse in circuit - Describe the types of circuit breaker : miniature circuit breakers (MCB), moulded case circuit breakers (MCCB) - Describe the functioning of earth fault protective devices: residual current circuit breaker (RCCB), earth leakage circuit breaker (ELCB) - Describe the working principles of fuses and circuit breakers - Describe the different types of short circuit: internal short circuit, external short circuit - Describe advantages and types of earthing (including dry and chemical earthing)	Identify the cause of short circuit - Test the continuity of protective devices - Remove and replace protective devices - perform regular and dry//chemical earthing
L3-MST-ET-3	**LED Light**	Diagnose and repair fault in LED Light	Describe - LED power supplies and LED drivers - special safety and handling precautions to be taken during LED luminary testing - steps to Finding and repairing component level fault - Finding and repairing LED strip level fault	Identify the components of LED Light, LED power supplies, LED drivers - Demonstrate the dismantling of LED - Demonstrate the replacing of LED light engine, LED strips and other components - Detect component level faults - Detect strip level faults

Unit Code	Unit Title	Learning Outcome	Knowledge Evaluation	Performance Evaluation
L3-MST-ET-4	**Electrical Home Appliances - I**			
	Electric Iron	Diagnose and repair faults in the electric Iron	Describe the types of electric iron - Describe the construction, functions and specifications of electric iron - Describe the precautions to be adopted while using electric iron - Describe the purpose of various components of electric iron - Describe the steps involved in dismantle, testing and assembling of electric iron - Describe the common faults in electric iron- element is dead, thermostat is not controlling temperature, selector pointer is damaged, heat proof cap is damaged, fuse has burnt, body is short circuited, indication light does not work, iron does not heat properly, etc.	Identify the components of electric iron - Demonstrate the dismantling and assembling of the electric iron - Demonstrate the knowledge of testing, the functioning of element/electrical plate
	Electric Heater and Geyser	Diagnose and repair faults in Electric Heater and Geyser	Describe the types of Electric Heater and Geyser - Describe the construction, functions and specifications of Electric Heater and Geyser - Describe the precautions to be adopted while using Electric Heater and Geyser - Describe the purpose of various components of Electric Heater and Geyser - Describe the steps involved in dismantle, testing and assembling of Electric Heater and Geyser - Describe the circuit diagram - Describe the common faults in Electric Heater and Geyser- elements is burnt, problem with cable, problem with thermostat, etc.	Diagnose and provide remedies for the common faults in Electric Heater and Geyser- elements is burnt, problem with cable, problem with thermostat, etc.
	Electric Kettle	Diagnose and repair faults in an Electric Kettle	- Describe the construction, function and working principle of electric kettle - Describe various tools and equipment used for repair of electric kettle - Describe the electric circuit system in electric kettle - Describe the precautions to be adopted while using electric kettle - Describe the common faults of rice cooker	Identify various components of Electric kettle - Diagnose and rectify common electrical faults in an electric kettle
	Toaster/Sandwich Maker	Diagnose and repair faults in a toaster / sandwich maker	Describe the types of Toaster/Sandwich maker - Describe the construction, functions and specifications of Toaster/Sandwich maker - Describe the precautions to be adopted while using Toaster/Sandwich maker - Describe the purpose of various components of Toaster/Sandwich maker - Describe the steps involved in dismantle, testing and assembling of Toaster/Sandwich maker - Describe the circuit diagram - Describe the common faults in Toaster/Sandwich maker- (element is dead, thermostat is not controlling temperature, fuse has burnt, body is short circuited, indication light does not work, Toaster/Sandwich maker does not heat properly, etc.)	Diagnose fault and provide remedies for the common faults in Toaster/Sandwich maker- (element is dead, thermostat is not controlling temperature, fuse has burnt, body is short circuited, indication light does not work, Toaster/Sandwich maker does not heat properly, etc.)

Unit Code	Unit Title	Learning Outcome	Knowledge Evaluation	Performance Evaluation
	Rice Cooker	Diagnose and repair faults in a rice cooker	- Describe the construction, function and working principle of rice cooker - Describe various tools and equipment used for repair of rice cooker - Describe the electric circuit system in rice cooker - Describe the precautions to be adopted while using rice cooker - Describe the purpose of various components of rice cooker like temperature control, timer unit - Describe the common faults of rice cooker	Identify various components of Electric rice cooker - Diagnose and rectify common electrical faults in a rice cooker
	Mixer/Blender/ Juicer/Grinder	Diagnose and repair faults in a Mixer/Blender/ Juicer/Grinder	Describe the types of Mixer/Blender/Juicer/Grinder - Describe the construction, functions and specifications of Mixer/Blender/Juicer/Grinder - Describe the precautions to be adopted while using Mixer/Blender/Juicer/Grinder - Describe the purpose of various components of Mixer/Blender/Juicer/Grinder - Describe the steps involved in dismantle, testing and assembling of Mixer/Blender/Juicer/Grinder - Describe the common faults in Mixer/Blender/Juicer/Grinder	Diagnose the common faults and suggest remedies - basic electrical faults such as improper/no earth, defective power cord, connector or internal wiring defect, short/ loose/open contacts, blown fuse, abnormal noise during use such as loose jar coupler, overloading of jar, worn out blade shaft, worn out jar bush, worn out/broken motor coupler, appliance not running due to dysfunctional motor, overload circuit breaker tripping, no power supply, overflowing/leaking of contents from the jar such as faulty fitting of dome lid cap, dome gasket, overloading of the jar, detect problems in the indicator switch due to lack of power supply, tripping of overload circuit breaker etc.
L3-MST-ET-5	**Entrepreneurship Development - I**	Demonstrate the knowledge of entrepreneurship and characteristics of entrepreneurs	Describe entrepreneurship, risks and rewards	Demonstrate the knowledge of entrepreneurship, risks and rewards Give examples of entrepreneurship
		Demonstrate the knowledge of challenges facing small business	Describe challenges facing small businesses like Financing , Access to markets, Government policies , Inadequate managerial skills	Identify a small business and list its challenges and scope for improvement
		Explain the factors that affect the development of entrepreneurship	Describe the factors that affect the development of entrepreneurial spirit in people	Identify an idea for an enterprise and do research in the community - Calculate Pricing for types of repairs done in class.

NSQF Multi skill technician- Level 4 Class 12th - Curriculum				
Unit Code	**Unit Title**	**Learning Outcome**	**Knowledge Evaluation**	**Performance Evaluation**
L4- MST-ET-1	**E-Waste**	Demonstrate the knowledge of e-waste	Define e-waste - Describe its potential toxic hazards - Safe Disposal techniques and prevention of exposure	Demonstrate the techniques to dispose of potential e-waste
L4- MST-ET-2	**Electrical Home Appliances - II**			
	Oven	Diagnose and repair faults in microwave oven	Describe the types of microwave Oven - Describe the construction, functions and specifications of microwave Oven - Describe the precautions to be adopted while using microwave Oven - Describe the purpose of various components of microwave Oven - Describe the steps involved in dismantle, testing and assembling of microwave Oven - Describe the common faults in microwave oven	Identify the components of microwave oven - Demonstrate the dismantling and assembling of the microwave oven - Detect basic electrical faults such as improper/no earth, defective power cord, connector or internal wiring defect, short/ loose/open contacts, blown fuse - Diagnose problem of oven running but not heating due to shorted diode, HV transformer or magnetron, damaged magnetron dome, magnetron insulator breakdown, shorted HV capacitor or HV wiring - Diagnose reasons low heating due to ageing magnetron, cracked magnet, burned dome or magnetron insulator breakdown - Identify reasons for intermittent/uneven heating due to oxidised/burned connection to magnetron filament terminals, burned connector due to poor crimp or weakened connection - Detect electrical power problems such as loose terminal connections, open motor windings etc. - Detect other problems such as defective touch panel/keypad, defective control board, defective sensor unit, burned slip on connector, open fuse/open HV capacitor, open HV diode etc
	Fan	Diagnose and repair faults in a fan	Describe the types of Fan - Describe the construction, functions and specifications of Fan - Describe the precautions to be adopted while using Fan - Describe the purpose of various components of Fan - Describe the steps involved in dismantle, testing and assembling of Fan - Describe the circuit diagram - Describe the common faults in Fan- bearing is damaged, bush is loose, capacitor is burnt, winding burnt, problem with revolving system, heating of fan, sound in fan, electrical connection problem, etc.	Diagnose and provide remedies for the common faults in Fan- bearing is damaged, bush is loose, capacitor is burnt, winding burnt, problem with revolving system, heating of fan, sound in fan, electrical connection problem, etc.

Unit Code	Unit Title	Learning Outcome	Knowledge Evaluation	Performance Evaluation
	Cooler	Diagnose and repair faults in a cooler	Describe the types of Cooler - Describe the construction, functions and working principle of Cooler - Describe various tools and equipment used for repair of Cooler - Describe the electric circuit system in Cooler - Describe the function and application of relays, OLP, thermostat, door switch, and no frost electrical control system, timer, defrost heater, bimetal thermostat - Describe the precautions to be adopted while using Cooler - Describe the purpose of various components of Cooler - Describe the common faults related to fan, capacitor, wiring, motor winding, short circuit, pump, etc.	Diagnose fault and provide remedies for the common faults related to fan, capacitor, wiring, motor winding, short circuit, pump, etc. - Change khus pad of cooler
	Semi-Automatic Washing Machine	Install Semi-Automatic Washing Machine	Describe - installation-site requirements (structural and plumbing requirements) - different types of washing machines such as front load and top load - different features and functionalities of various models - different parts in the washing machine - safety precautions to be taken while installing - manual-based procedure of installing the washing machine - - use of test equipment and tools such as multi-meter, volt - ohmmeter	- Place the washing machine at appropriate location - Install the machine as per the manual - operate and check that there are no leaks and the machine is in a safe and stable condition - explain the precautions to be taken while using the washing machine
		Diagnose and repair faults in semi-automatic washing machine	Describe - basic parts such as valve strainers, fill hose, drain line, pressure tube, water valves, pressure sensor - different cycles in the machine running process and possible symptoms of faults in respective cycles - controls and features of different washing machine models - faults common to all types of washing machines and faults specific to different models - functioning of components and parts such as solenoids and plungers - basics of gears, behaviour of gear mechanism, understanding of linear and angular movements, concepts such as rpm, torque etc. - frequently occurring faults such as noise, water not filling/over filling, water not draining their causes and solutions - components/modules of the washing machine and their prices	Diagnose and repair frequently occurring faults such as noise, water not filling/over filling, water not draining their causes and solutions - identify the cycle(fill/wash and rinse/spin and drain) during which the problem occurs - inspect basic parts such as valve strainers, fill hose, drain line, pressure tube, water valves, pressure sensor - carry out basic tests such as power supply inspection, volt ampere test and continuity test - disassemble the washing machine and check for faults in the control/service panel, lid switch, temperature selector switch, water level control switch, timer, etc. - follow the electrical circuit path and inspect each component in that sequence in order to identify any electrical faults in the unit - ensure that all parts such as motors, transformer, pulley and belt system, motor starting switch, solenoid, clutch lining have been inspected - Confirm functionality of the repaired unit

Unit Code	Unit Title	Learning Outcome	Knowledge Evaluation	Performance Evaluation
L4- MST- ET-3	**UPS and Inverter**	Install UPS and Inverter	Describe the role of UPS and Inverter - different features and functionalities of various models - safety precautions to be taken while installing such as wearing rubber gloves, removing metals objects from the surroundings etc. - manual-based procedure of installing the UPS/inverter - packaging waste disposal procedures	- Demo a pre-installation site visit - Remove packaging and check accessories - Identify location to place the UPS/Inverter - check functioning
		Diagnose and repair faults in UPS/Inverter	Describe the construction, functions and specifications of UPS/Inverter - Describe the steps involved in dismantle, testing and assembling of UPS/Inverter - Describe the common faults in UPS/Inverter like blown fuse, dead battery etc - Describe the battery charging and maintenance of UPS	Identify the components of UPS/Inverter - Demonstrate the dismantling and assembling of the UPS/Inverter - Detect basic electrical faults such as improper/no earth, defective power cord, connector or internal wiring defect, short/ loose/open contacts, blown fuse, dead battery etc
L4- MST- ET-4	**Entrepreneurship Development - II**	Demonstrate the knowledge of starting a new enterprise and suitability of funding	Describe how to - register a business in your area - mobilize and organize resources - indentify advantages and disadvantages of different sources of funding	Give an example of a registered and unregistered business in your area, advantage and disadvantages of each and how they arrage resources and funding
	Project Proposal	Demonstrate the knowledge of making a project proposal	Describe steps used to make project proposal	Practical proposal making by meeting local businessmen in repair
	Project Execution	Implementation of project proposal	- Prepare a plan to implement the project proposal in real life - Mobilize resources for launch of the project - Launch and make the project proposal operational	Analysis of the execution and identification of improvements