सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES
MSME TECHNOLOGY CENTRE

MODEL CURRICULUM

Qualification Name:

Technician - Room Air Conditioner & Home Appliances

Qualification Code:

Version: 2.0

NCrF/NSQF Level: 4.0

Model Curriculum Version: 2.0

Submitted By:

MSME TECHNOLOGY CENTRE

O/o DC MSME, Ministry of Micro, Small and Medium Enterprises

Govt. of India

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NOS / MODULE TEMPLATE

NOS /Module: STUDY ON BASIC ELECTRICAL/ELECTRONICS, SAFETY & HAND TOOLS -RACHA

NOS /Module Code: MSME/RACHA/01

Outcomes:

After completion of course Student should be able to:

1. Get knowledge about Safety and Safety Precautions.
2. Understand about different Electronic Component.
3. Understand different Measuring Instruments.
4. Understand different Semiconductor

Theory Hours: 120 **Practical Hours:** **THEORY Marks: - 100** **Practical Marks:**

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	TH Marks
UNIT-I	Safety	At the end of this unit Student should be able to Understand about Safety. Understand How to use Basic Tools Get knowledge about safety precautions..	General safety precautions. Accidents Fire and Fire Accidents First Aid, Personal Protective Equipment (PPE) Selecting and using PPE. Maintenance of PPE. Monitor and review. Types of PPE. Emergency equipment. Basic hand tools Types of Screwdrivers Pliers, Tweezers, Steel Rule, Scriber.	20	10
UNIT-II	Electronics Fundamentals	At the end of this unit Student should be able to Get Knowledge about voltage, current and Atom. Get Knowledge about electronic component. Understand about operating system of computer.	Matter, molecules, atom. Voltage and current. Voltage and current device. Process of Resistor, capacitor Basic units Basic of computer and its use	20	20
UNIT-III	Basic electronics	At the end of this unit Student should be able to Understand about Passive component. Understand how to use soldering and disordering Equipment's	Process of Inductors. Describe Conductor, insulator, wire. Describe the types of Power supplies. Process of Soldering, disordering equipment's.	20	20
UNIT-IV	Semiconductor	At the end of this unit Student should be able to Understand about different type of Semiconductors.	Semiconductor physics. Semiconductor diodes. Filters. Special purpose diodes Power supply.	20	20

		Understand about diodes and rectifier			
UNIT-V	Transistor and its application	At the end of this unit Student should be able to Get knowledge about Active component. Understand about Emitter, collector and BaseHow to measure transistor.	Types of transistor. BJT. FET. Identify transistor terminals, Applications of transistor	20	20
UNIT-VI	Basic technology	At the end of this unit Student should be able to get knowledge abour ohm's law,various formula Trainees get knowledge about resistor,capacitor and diode working process.	What is ohm’s law, what is voltage, current, resistance? Series circuit and parallel circuit. Resistor, Variable Resistor(Rheostat), Trimmer Capacitor Polarized Capacitor, LED (Light Emitting Diode), Photodiode, Transistor NPN, Transistor PNP.	20	10

NOS /Module: ADVANCE SKILL ENHANCEMENT ON TROUBLESHOOTING, ASSEMBLY, DISASSEMBLY, INSTALLATION & DEMONSTRATION ON RESPECTIVE PRODUCTS -RACHA

NOS /Module Code: MSME/RACHA/02

Outcomes:

After completion of course Student should be able to:

1. Understand mechanism of AC, REFRIGERATOR, WASHING MACHINE, OVEN
2. Understand operating method of AC, REFRIGERATOR, WASHING MACHINE, OVEN
3. Understand repairing and troubleshooting of AC, REFRIGERATOR, WASHING MACHINE, OVEN
4. Understand servicing of AC, REFRIGERATOR, WASHING MACHINE, OVEN

Theory Hours: 60 Practical Hours: 210 THEORY Marks: - Practical Marks: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT-I	Introduction	Get knowledge About Samsung company overview. Samsung globally report and roles Samsung products and structure	Company overview, Philosophy & Product portfolio. Reporting Structure & Individual's role	6	5
UNIT-II	Basic Terminology	At the end of this unit Student should be able to understand Basics of Electricals and Electronics Basics of Heat	At the end of this unit Student should be able to understand Basics of Electricals and Electronics Basics of Heat	7	5
UNIT-III	AC - Basics	At the end of this unit Student should be able to understand Parts Overview Advanced technolog	Types of compressor and their operating principles – Reciprocating, Rotary, Scroll, Screw. Types of heat exchangers and their functioning, Fin and tube, PFC, shell and tube, plate type; Problems in heat exchanger. Types of fan and blowers - propeller, centrifugal, cross flow. Expansion Devices - Capillary, TEV, EEV Accessories- Accumulator, Oil separator, Receiver,	12	15

			Mufflers, Thermostat, 4-Way reversing valve, Heat Pump Cycle Types and functioning of motors - AC / DC motors Overview of inverter Air-conditioner, Inverter technology and functioning.		
UNIT-IV	AC – Tools & Safety	At the end of this unit Student should be able to understand Tools Safety & PL	Basic tools identification - Tube cutter, Drilling machine, Flaring tool, Tube benders etc. General safety guidelines, Product Prevention - Introduction, PL case by wrong installation	12	5
UNIT-V	AC – Installation	At the end of this unit Student should be able to understand Installation Process Pipe Preparedness Installation Practice Demo & Installation	Installation instruction, Correct Installation method, Place Selection (Indoor & Outdoor)Pre Installation Requisites & Post Installation checkpoints Pipe cutting, Flaring, Bending, Swaging, Tube brazing practice Core Drilling exercise, Tube insulation, wiring and piping layout, Vacuuming, Gas Charging Method, Complete InstallationRemote control features and demo with Role Play Cassette Unit Installation, Installation – Do's & Don'ts	11	5
UNIT-VI	AC - Trouble Shooting	At the end of this unit Student should be able to understand Technical repair Star rating & preventive maintenance	Compressor trouble shooting, Symptoms of failure, How to check failed Compressor, Steps to replace compressor Electrical trouble shooting, How to diagnose electrical parts failure, Checking of PCB. Symptom based troubleshooting : No Cooling Repair, No Power Repair, Noise Repair, Water leakage Repair Overview of Star labeling (BEE) & E-Waste Concept Safety Precautions, Preventive Maintenance & Cleaning of AC, Important Tips, Checkpoints, Optional Skills	11	5

UNIT-VII	Refrigerator Basics	At the end of this unit Student should be able to understand HA Range and Tools Technology Overview Operating Instructions	Home Appliances Product Range, Repair and Installation Tools Kit & Safety Precautions What is Refrigerator ? Advantages of Refrigerator; Types of Refrigerators, Difference between Direct Cool & Frost Free Refrigerator, What is Refrigeration? Steps of Refrigeration Cycle, Sealed System parts working process, What is refrigerant & types of refrigerants. Key Features, Correct Installation Place, Installation Process, How to use?, No Defect Found Solutions, Do's and Don'ts / Safety Precautions , Check Points	12	5
UNIT-VIII	Direct Cool Refrigerator	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault	7	5
UNIT-IX	Mechanical Frost Free Refrigerator	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault	6	5
UNIT-X	Semi Electronics Frost Free Refrigerator	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault	6	5
UNIT-XI	Electronics Frost Free Refrigerator	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault	12	5

UNIT-XII	Inverter Refrigerator	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Demerits of Conventional Compressor Merits of Inverter Compressor Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault, Check Points	12	5
UNIT-XIII	Refrigerator Sealed System	At the end of this unit Student should be able to understand Sealed System Repair	Mandatory Parts &Equipment's, Symptoms, Refrigerant Discharge Process, Compressor disassembling, Nitrogen Flushing , Parts Assembling, Leakage Testing, Vacuuming, R600a Safe Gas Charging Process, Final Inspection	6	5
UNIT-XIV	Washing Machine Basics	At the end of this unit Student should be able to understand Technology Overview Operating Instructions	What is Washing Machine & its advantages. Types of Washing machine, Difference between Semi Automatic& Fully Automatic Washing Machine, Washing Principle Key Features, Correct Installation Place, Installation Process, How to use, No Defect Found Solutions, Do's and Don'ts / Safety Precautions , Check points	6	5
UNIT-XV	Semi-Automatic Washing Machine	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault	25	5
UNIT-XVI	Fully Automatic Washing Machine	At the end of this unit Student should be able to understand Technical Education and Troubleshoot	Parts Working and Checking process Parts Assembly & Disassembly Process Wiring Diagram, Technical Fault	25	5
UNIT-XVII	Microwave Oven Basics	At the end of this unit Student should be able to understand Technology Overview Operating Instructions	What is Microwave Oven, Advantages, Types of Microwave Oven, Difference between Solo, Grill and Convection Oven Working Principle Key Features, Correct Installation Place, Installation Precautions, How to use,	10	5

			No Defect Found Solutions , Do's and Don'ts / Safety Precautions		
UNIT-XVIII	Convection Microwave Oven	At the end of this unit Student should be able to understand Technical Education Troubleshoot	Parts Working and Checking process Assembly & Disassembly, Wiring Diagram, Technical Fault	24	5

NOS /Module: ON JOB TRAINING (OJT)

NOS /Module Code: MSME/RACHA /03

Outcomes:

After completion of course Student should be able to

1. Understand about how to work with Team.
2. Understand about how to Behavior with customer.
3. Get knowledge about how to work as a Service Engineer
4. Get knowledge about how to work as a Demo Engineer.

THEORY HOURS: NA PRACTICAL HOURS: 210 VIVA MARKS: 100 PRACTICAL MARKS: -

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT-I	On job training (OJT)	• At the end of this unit Student should be able to Get practical field knowledge. Trainees works in Samsung authorized service centre and get practical skill and knowledge. Understand how to behaviour with the customer	Installation Demonstration servicing Repairing Troubleshooting Gas charging	210	100

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skill

NOS /Module Code: MSME/ES/01

THEORY HOURS: 30 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Refer Standard Curriculum developed by NCVET.
(https://nqr.gov.in/downloads/pdfs/30-hours_MC_Employability_Skills.pdf)