



Facilitator Guide



Sector
Electronics

Sub-Sector
Consumer Electronics & IT Hardware

Occupation
Manufacturing

Reference ID: **ELE/Q7804, Version 3.0**
NSQF Level: 4

PCB Assembly Operator

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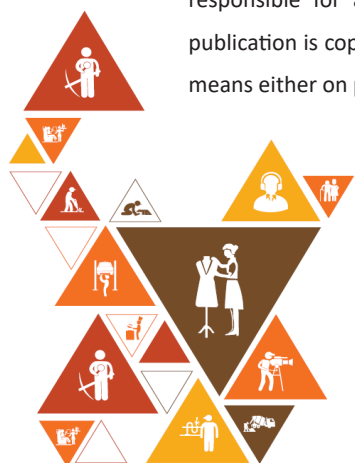
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Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”



Acknowledgements

The content of this faculty guide is aligned to the curriculum of QP/NOS PCB Assembly Operator (ELE/Q7804).

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About this Guide

This faculty guide is designed to enable training for the specific Qualification Pack (QP). Each National Occupational (NOS) is covered across Unit/s.

This book is designed to enable a candidate to acquire skills that are required for employment. The content of this book is completely aligned to the National Occupation Standards QP/NOS and conform to the National Skills Qualification Framework (NSQF).

The Qualification pack of PCB Assembly Operator, Level 4 includes the following NOS's which have all been covered across the units:

Compulsory NOS:

1. **ELE/N7812:** Assemble Printed Circuit Board (PCB)
2. **ELE/N9905:** Work effectively at the workplace
3. **ELE/N1002:** Apply health and safety practices at the workplace
4. **DGT/VSQ/N0102:** Employability Skills (60 Hours)

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS. The symbols used in this book are described below.

Symbol Used



Steps



Activity



Tips



Notes



Objectives



Do



Ask



Explain



Elaborate



Field Visit



Say



Facilitation Notes



Demonstrat



Resources

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Bridge Module

Key Learning Outcomes

At the end of this module, trainees will be able to:

1. Describe the size and scope of the electronic industry and its subsectors.
2. Discuss the role and responsibilities of a PCB Assembly Operator.
3. Describe various employment opportunities for a PCB Assembly Operator

Unit 1.1: Size and Scope of the Electronics Industry and Its Various Sub-sectors

Unit Objectives

At the end of this unit, trainees will be able to:

1. Describe the size and scope of the Electronics industry
2. Identify the sub-sectors of the Electronics industry

Resources to be Use

Facilitator can use the available objects such as a marker, duster, pen, notebook etc.

Notes for Facilitation

- Ask the trainees about the expectations from the course.
- Invite trainees to participate. List the expectations on the whiteboard.
- Play the music keepers game with trainees as an icebreaker activity.
- You could ask the trainees who get out during the game to be the music keepers. They can start and stop the music as the game progresses.
- Encourage shy trainees to provide information about themselves by prompting them with questions such as 'what do you enjoy doing the most', 'what is your favorite movie or book' etc. Ask the trainees about the expectations from the course.

Do

- Take a parcel, mention some details such as student name, hobbies, likes, dislikes etc.
- Make the trainees stand in a circle, close enough to the person each side of them that they can pass the parcel quickly.
- Say 'Stop' when the trainees least expect it. The person who has the parcel at that time should get out from the class.
- Those who get out should introduce themselves by providing the details mentioned in the parcel.
- The winner of the game should stand and introduce himself/herself at the end of the game.
- At last, say thanks to the trainees for their participation.
- Ask for feedback on the exercise of participation and what they derived out of it.

Ask

- Ask about their understanding for electronics industry.
- What they understand by various sub-sectors of electronic industry?

Say

- Electronics industry is the business of creating, designing, producing, and selling devices such as radios, televisions, stereos, computers, semiconductors, transistors, and integrated circuits etc. The electronics industry transformed factories, offices, and homes, emerging as a key economic sector that rivalled the chemical, steel, and auto industries in size.
- The electronics sector is growing rapidly as a result of increasing demand from emerging market economies. As a result, many countries are increasingly producing more electronics, and investment in the foreign production of electronics has increased dramatically.

Elaborate

- Different types of electronic products in market
- Application of electronic in different fields
- Growth in electronic industry
- Challenges and trends in electronic industry
- Sectors and sub-sectors of the electronics industry

Notes for Facilitation

- Start with a positive and happy note
- Summarize the main points.
- Encourage them to ask questions and involve during the session.
- Share your inputs and insight to encourage the trainees.
- Wrap the session up after summarizing the key points and answering questions.

Unit 1.2: Opportunities for PCB Assembly Operator in the Industry

Unit Objectives

At the end of this unit, trainees will be able to:

1. Describe various employment opportunities for a PCB Assembly Operator

Resources to be Use

Facilitator can use the available objects such as a marker, duster, pen, notebook etc.

Ask

- What are the personal attributes required for a PCB Assembly Operator job?

Elaborate

Elaborate and discuss following points as given in participant handbook.

- Career pathways of PCB Assembly Operator
- Personal attributes of a PCB Assembly Operator

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 1.3: Roles and Responsibilities of a PCB Assembly Operator

Unit Objectives

At the end of this unit, trainees will be able to:

1. Understand the duties of PCB Assembly Operator

Resources to be Use

- Available objects such as whiteboard, marker pens, duster etc.
- PC with LCD Projector or Flip Chart

Do

- Greet and welcome the participants to the next session of the program.
- Before starting the session ask them do they have any doubts pertaining to the previous unit.
- Capture their responses on board and share them wherever necessary.

Say

- A PCB assembly operator is responsible for manually placing different types of components on the PCB as per the design requirements and then soldering them.

Explain

- Explain the role and responsibilities of a PCB Assembly Operator.
- Explain job description of PCB Assembly Operator
- Explain key competencies required for PCB Assembly Operator job
- Explain organisational policies on incentives, delivery standards, personnel management and public relations (PR)
- Skilled manpower problem in electrical equipment industry

Notes for Facilitation

- Summarize the main points.
- Give trainees some tips for how to become a successful PCB Assembly Operator.
- Give the trainees a brief overview of what all will be covered in the program.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answer all the questions.

Scan the QR code or click on the link to watch related videos



www.youtube.com/watch?v=A8LSc2GXn9E

Size and scope of the electronics



www.youtube.com/watch?v=i6vam-FveBc

Career Pathways of Electrical Assembly Operator



<https://www.youtube.com/watch?v=usmDfGM2KmU>

Job Description: PCB Assembly Operator

[illegible]



ELE/N7812

Key Learning Outcomes

At the end of this module, trainees will be able to:

1. State the work flow involved in assembly process of the company and one's role in the work flow.
2. Explain how to use hand tools such as lead forming tools, cutter, cutting machine, soldering station, etc.
3. Explain component stocking policy.
4. Explain basic electronics, component identification and characteristics of the components such as resistor, capacitor, ICs.
5. Describe various assembly processes such as thru-hole technology (THT), surface mount technology (SMT), and mixed technology.
6. List color codes and polarity of components.
7. State various safety and quality standards followed in the organisation.
8. Describe comparison between ROHS & Non-ROHS compliant solder.
9. Explain the basics of soldering such as handling the soldering iron, iron temperature, etc. and types of soldering such as dry and cold solder.
10. State the regulation of operating speed and temperature as well as soldering shortcomings such as solder short and dry solder.
11. Explain different types of errors identified during functional test and methods to rectify the same.
12. Explain company's reporting structure, delivery standards and personnel management and Intellectual Property Rights (IPR).

Unit 2.1: Assembly Work Flow

Unit Objectives

At the end of this unit, trainees will be able to:

1. State the work flow involved in assembly process of the company and one's role in the work flow.
2. Explain how to use hand tools such as lead forming tools, cutter, cutting machine, soldering station, etc.
3. Explain component stocking policy.

Resources to be Use

Facilitator can use the available objects such as a marker, duster, pen, notebook, lead forming tools, cutter, cutting machine, soldering station, etc.

Say

Start the session by saying this

- An assembly line is a manufacturing process in which interchangeable parts are added to a product in a sequential manner to create an end product.
- Assembly line methods were originally introduced to increase factory productivity and efficiency.
- Electronics are an integral part of our daily lives. Everything from our smart phones to our cars includes electronic components.
- Now we will learn about PCB assembly process

Ask

- What they understand by PCB?
- How to build a PCB?
- What are the considerations for building a PCB?

Elaborate



Elaborate and discuss below points with trainees

- Work flow involved in assembly process and one's role in the work flow
- PCB Design Basics
- Different layers and composition of PCB
 - » Substrate
 - » Copper
 - » Solder mask
 - » Silkscreen
- PCB types
 - » Rigid PCB
 - » Flexible PCB
 - » Metal Core PCB
- Features and application of each type of PCB

Ask



Ask these questions to trainees:

- What is the PCBA?
- What are different methods of PCB assembly process?

Elaborate



Elaborate and discuss following points with trainees:

- Three types of PCB Assembly (PCBA) process
 - ✓ Thru-Hole Technology (THT) Assembly Process
 - ✓ Surface Mount Technology (SMT) Assembly Process
 - ✓ Mixed Technology
- Preparatory activities before PCBA process
- PCB Assembly Process
 1. Apply Solder Paste Using Stencil
 2. Placement of Components
 3. Reflow Soldering
 4. QC and Inspection i.e. manual, Optical Inspection and X-ray Inspection
 5. THT Component Fixation and Soldering - Manual Soldering and Wave Soldering
 6. Final Inspection and Functional Test

Explain

- Explain Thru-Hole Technology (THT) Assembly Process
- Explain Surface Mount Technology (SMT) Assembly Process
- Explain Mixed Technology
- Explain steps of PCBA process

Do

- Show methods of PCB assembly to trainees.

Demonstrate

Take the trainees into workshop and demonstrate steps of PCAB process as given in trainee handbook to them.

Activity

- Ask the students to assemble together.
- Divide the class into five equal groups.
- Tell them to perform PCBA process.
- By this activity, they learn about PCBA process.

Skill Practice	Time	Resources
Perform assembly of PCB	24 hours	PCB board, Development Kits (DKs), Evaluation Kits (EVKs), and Mass Production Modules (MPMs)

Do

- Provide material, tools and equipment required for assembly of PCB and its components to trainees.
- Tell them to perform PCBA process as demonstrated in workshop.
- Guide the groups during the work.
- Go around and make sure they are doing it properly.
- Share your inputs and insight to encourage the trainees and add onto what they are doing.

Say

- During assembly process, various types of tools and equipment are also required. In this session we learn about those tools and equipment required during work.
- Proper handling and operation of tool is very important, otherwise this can be dangerous for you and others also.

Ask

- List various tools and equipment required during work.

Elaborate

Elaborate and discuss selection criteria, functioning and use of following tools and equipment as given in participant manual

- Screwdriver
- Wrench
- Utility Knife
- Hacksaw
- Pliers
- Wire Stripper
- Surgical tools like tweezers, forceps, and scissors
- Portable electric drill
- Metal files
- Soldering tools like Soldering Iron, Soldering Iron Stand, Desoldering Pump etc.
- Multimeter
- LCR Meter
- Oscilloscope
- Signal Generator
- Prototyping tools i.e. Breadboard, Jumper Wires, Zero PCB
- Auxiliary tools i.e. Magnifying Glass, Paint Brush, Measuring Tape, Hammer, Flashlight

Do

- Show all the tools and equipment to the trainees.
- Demonstrate the use of tools and equipment.
- Explain the functioning and use of tools and equipment.

Explain

- Explain body parts of all tools and equipment.
- Explain features of all tools and equipment properly.
- Explain safety tips for using tools and equipment.
- Explain component stocking policy.

Demonstrate

Take the trainees into workshop and demonstrate following activities as given in trainee handbook

- Use of tools
- Safe handling of tools

Activity

- Ask the students to assemble together.
- Divide the class into five equal groups.
- Tell them to show use of tools and equipment required.
- By this activity, they learn about how to use tools and equipment properly.

Skill Practice	Time	Resources
Use of tools and equipment	4 hours	Tools and equipment required

Do

- Provide tools and equipment to each group.
- Tell them to use tools and equipment properly as demonstrated in workshop.
- Guide the groups during the work.
- Share your inputs and insight to encourage the trainees and add onto what they are doing.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 2.2: Basics of Electronics and Related Concepts

Unit Objectives

At the end of this unit, trainees will be able to:

1. Explain basic electronics, component identification and characteristics of the components such as resistor, capacitor, ICs.

Resources to be Use

Facilitator can use the available objects such as a marker, duster, pen, notebook etc.

Say

Start the session by saying this

- The electrical system is one of the most important systems today. Every year more and more components and systems use electricity.
- Electricity may be difficult for some people to learn for the following reasons.
 - » It cannot be seen.
 - » Only the results of electricity can be seen.
 - » It has to be detected and measured.
 - » The test results have to be interpreted.
- A circuit is a complete path in which electrons travel from a power source through a load.

Ask

- What is electricity and how it generates?
- You could ask direction of flow of electron the circuit.
- You could ask different sources of electricity.
- What is a circuit and how current flows in the circuit?
- What are the different components of a circuit?

Elaborate



Discuss and elaborate following topics with the trainees as given in participant manual

- Electric current and its types
- Circuit
- Parts of a circuit - a power source, such as a battery, fuses, circuit breakers, power path, load, switches and controls.
- Open circuit and close circuit
- Parameters of a circuits - Voltage, current and resistance
- Ohm's law

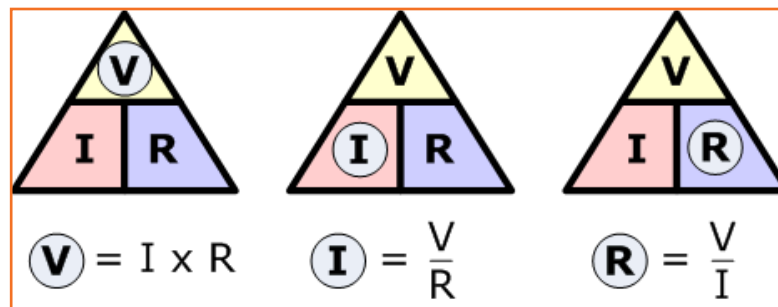


Fig 2.2.1: Ohm's law

- Types of electric circuit
 - o Series Circuit
 - o Parallel Circuit
 - o Series Parallel Circuit

Demonstrate



Take the trainees into workshop, make a circuit and demonstrate the working of circuit as given below

- A battery with 12 volts is connected to a resistor of 4 ohms
- Use Ohm's law and calculate the number of amperes that will flow through the wires and the resistor.
- The values for the voltage (12) and the resistance (4) were substituted for the variables E and R , and I is thus 3 amperes

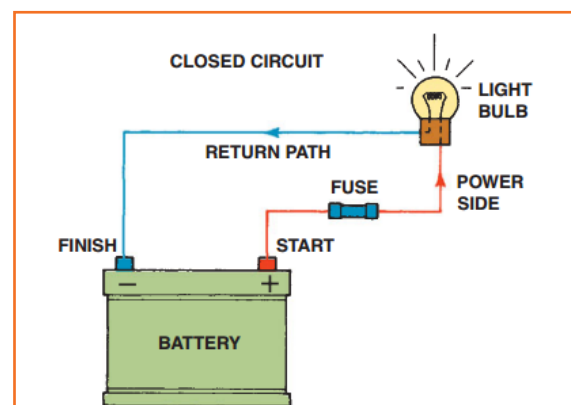


Fig 2.1.2: Electric circuit

Say

- A circuit consists of a number of components that may be electrical, electronic, mechanical and so on.
- Circuit elements are classified into active or passive components. Let's discuss about them.

Elaborate

Elaborate and discuss below points with trainees

- Active
- Passive
- Electro-mechanical

Do

- Show various active, passive and electro-mechanical components to trainees.
- Explain their functioning and use with examples to them.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Tell the trainees to make a series and parallel circuit and calculate value of resistance.

Skill Practice	Time	Resources
Make series and parallel circuit and calculate the value of resistance of the circuit	2 hours	Battery Ammeter Voltmeter Light bulb Wires and connectors

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

Notes for Facilitation



- Tell them about different electrical and electronic components such as a resistor, capacitor, diode etc. used in the industry.
- Show them the electrical and electronic components.
- Explain them each component one by one.

Elaborate



Elaborate the functioning, use, characteristics and symbol of following electronic components as given in participant handbook.

- Resistor
- Capacitor
- Inductor
- Diode
- Transistor
- Integrated Circuits
- Microcontrollers
- Transformers
- Batteries
- Fuses
- Relays
- Switches
- Motors
- Circuit Breakers

Do



- Show each component to trainees.
- Show their symbols on white board.
- Explain their functioning and use in a circuit.
- Show how to read the specification and value of each component.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 2.3: Assembly Process

Unit Objectives

At the end of this unit, trainees will be able to:

1. Describe various assembly processes such as thru-hole technology (THT), surface mount technology (SMT), and mixed technology.
2. List color codes and polarity of components.

Resources to be Use

Facilitator can use the available objects such as a marker, duster, pen, notebook, PCB, assembly tools and equipment etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- As we already discussed, the PCB assembly process in previous unit in brief, here we will discuss only about methods of assembling.
- The PCB assembly process has automated and manual process, depends on the organisation to organisation.

Demonstrate

Take the trainees into workshop and demonstrate steps of PCBA process as given in trainee handbook to them.

1. Thru-Hole Technology (THT) Assembly Process
2. Surface Mount Technology (SMT) Assembly Process
3. Mixed Technology Assembly Process

Activity

- Ask the students to assemble together.
- Divide the class into five equal groups.
- Tell them to perform PCBA process.
- By this activity, they learn about PCBA process.

Skill Practice	Time	Resources
Perform assembly of PCB	24 hours	PCB board, Development Kits (DKs), Evaluation Kits (EVKs), and Mass Production Modules (MPMs)

Do

- Provide material, tools and equipment required for assembly of PCB and its components to trainees.
- Tell them to perform PCBA process as demonstrated in workshop.
- Guide the groups during the work.
- Go around and make sure they are doing it properly.
- Share your inputs and insight to encourage the trainees and add onto what they are doing.

Elaborate

Elaborate and discuss reading values, polarity and color coding of following electronic components with trainees:

- Resistor
- Capacitor
- Inductor
- Diode

Do

- Show how to read values, polarity and color coding of resistor, capacitor, inductor and diode to trainees.

Field Visit

Plan a visit in the industry and show the PCBA process for better understanding.

Unit 2.4: Safety & Quality Standards

Unit Objectives

At the end of this unit, trainees will be able to:

1. State various safety and quality standards followed in the organisation.

Resources to be Use

Facilitator can use the available objects such as a marker, duster, pen, notebook, safety equipment etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- At workplace, we need to follow organisational safety and quality standards. In this unit, we learn about them.

Ask

- What is the need of safety and quality standards?

Elaborate

Elaborate and discuss below points with trainees

- Electrical Safety Protective Methods
 - ✓ Use of Protective Equipment
 - ✓ General Protective Equipment and Tools
 - ✓ Alerting Techniques
 - ✓ Arc Flash Personal Protective Equipment
- IEC Safety and quality standards i.e. IEC 60364 series, IEC 61140, 60479 series, IEC 61201 etc.

Do



- Show electrical safety methods and equipment.
- Explain IEC safety and quality standards followed in organisation.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 2.5: Soldering

Unit Objectives

At the end of this unit, trainees will be able to:

1. Describe comparison between ROHS & Non-ROHS compliant solder.
2. Explain the basics of soldering such as handling the soldering iron, iron temperature, etc. and types of soldering such as dry and cold solder.
3. State the regulation of operating speed and temperature as well as soldering shortcomings such as solder short and dry solder.
4. Explain different types of errors identified during functional test and methods to rectify the same.

Resources to be Use

- Available objects such as white board, marker pens, duster, participant manual
- PC with LCD Projector or Flip Chart
- Soldering tools and equipment

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Soldering is a joining method used to join to components.
- In this unit, we will learn about soldering process.

Ask

Ask these questions to trainees:

- What is soldering process?
- What is the difference bewteen ROHS & Non-ROHS compliant solder?

Elaborate



Elaborate and discuss below points with trainees

- Soldering process
- Comparison between ROHS & Non-ROHS compliant solder
- Differences between the lead-free and lead-based solders
- Materials and equipment required
 - ✓ soldering iron
 - ✓ Rosin core solder
 - ✓ Stand to hold the hot soldering iron
 - ✓ Sponge
 - ✓ Solder braid
 - ✓ Prototype board
 - ✓ Steel wool or fine sandpaper
 - ✓ Crocodile clips
- Parameters like operating speed, temperature etc. need to consider
- Aolder short and dry solder

Do



- Show all the tools and equipment to the trainees.
- Demonstrate the use of tools and equipment.
- Explain the functioning and use of tools and equipment.

Explain



- Explain features of all tools and equipment properly.
- Explain safety tips for using tools and equipment.
- Explain cold joint and dry joint.

Demonstrate



Take the trainees into workshop and demonstrate steps of soldering process as given in trainee handbook to them.

Activity

- Ask the students to assemble together.
- Divide the class into five equal groups.
- Tell them to perform soldering process.
- By this activity, they learn about soldering process.

Skill Practice	Time	Resources
Perform soldering process	16 hours	PCB board, soldering tools and equipment

Do

- Provide material, tools and equipment required for soldering process to trainees.
- Tell them to perform soldering process as demonstrated in workshop.
- Guide the groups during the work.
- Go around and make sure they are doing it properly.
- Share your inputs and insight to encourage the trainees and add onto what they are doing.

Explain

- Explain different types of IoT testing
- Explain pre-requisites of IoT Testing

Elaborate

Elaborate and discuss below points with trainees

- Common problems and troubleshooting during soldering process
- Different types of errors identified during functional test

Demonstrate

Take the trainees into workshop and demonstrate following procedures as given in trainee handbook to them.

1. Troubleshooting of defects
2. Functional testing of PCB

Activity



- Ask the students to assemble together.
- Divide the class into five equal groups.
- Tell them to perform functional testing of PCB.
- By this activity, they learn about functional testing of PCB.

Skill Practice	Time	Resources
Perform functional testing of PCB	16 hours	PCB board, testing tools and equipment

Do



- Provide material, testing tools and equipment required for functional testing of PCB to trainees.
- Tell them to perform functional testing of PCB as demonstrated in workshop.
- Guide the groups during the work.
- Go around and make sure they are doing it properly.
- Share your inputs and insight to encourage the trainees and add onto what they are doing.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 2.6: Reporting Structure

Unit Objectives

At the end of this unit, trainees will be able to:

1. Explain company's reporting structure, delivery standards and personnel management and Intellectual Property Rights (IPR).

Resources to be Use

- Available objects such as white board, marker pens, duster, participant manual
- PC with LCD Projector or Flip Chart

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- A reporting structure refers to the interrelationship between various authorities in a company. This is a hierarchal chain of command that clarifies who reports to whom

Elaborate

Elaborate and discuss below points with trainees

- Company's reporting structure
- Need of reporting structure
- Types of Reporting Structures
- Company's documentation policy
- Organisational policies on incentives, delivery standards, personnel management and public relations (PR)

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Scan the QR code or click on the link to watch related videos



www.youtube.com/watch?v=j4-zlBI-oke
Work flow involved in assembly process



www.youtube.com/watch?v=uR5wlyCEVaM
Fundamentals of electricity



www.youtube.com/watch?v=4sBgu_tUpil
Troubleshooting and maintenance of drone



www.youtube.com/watch?v=RW9NO6H62oY
Repair and Replacement of Components of a Drone



www.youtube.com/watch?v=bBX2KAHisyo
List color codes and polarity of components



www.youtube.com/watch?v=wx9aszQZ6uE
Comparison between ROHS & Non-ROHS compliant solder

Key Learning Outcomes

At the end of this module, trainees will be able to:

1. State the importance of work ethics and workplace etiquette.
2. State the importance of effective communication and interpersonal skills.
3. Explain ways to maintain discipline in the workplace.
4. Discuss the common reasons for interpersonal conflict and ways of managing them effectively.

Unit 3.1: Effective Communication and Coordination at Work

Unit Objectives

At the end of this unit, trainees will be able to:

1. Work effectively at the workplace.
2. Demonstrate practices related to gender and PwD sensitization.

Resources to be Use

- Available objects such as white board, marker pens, duster.
- PC with LCD Projector or Flip Chart

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- People like hearing their own names, don't assume a person is more or less important, Self-assess and Respect other people's personal space are some ways of communicate with others properly.
- Communication is a tool which connects us with other human beings. An effective communication not only helps in developing a sense of belonging but also facilitates better working, improves relationships, reduces stress.
- Communication is the process of exchange of words, ideas, feelings. It is the meaningful exchange of information between two or more participants.
- Making a positive impression, cooperate with colleagues and work space savvy are some important tips to help you succeed on the job.

Ask

- What is the importance of work ethics and workplace etiquette?
- What are the ways of effective communication with colleagues?

Elaborate

Elaborate and discuss below points with trainees

- Organization policies and procedures while working with colleagues
- Work etiquette
- Interpersonal skills and Communication process

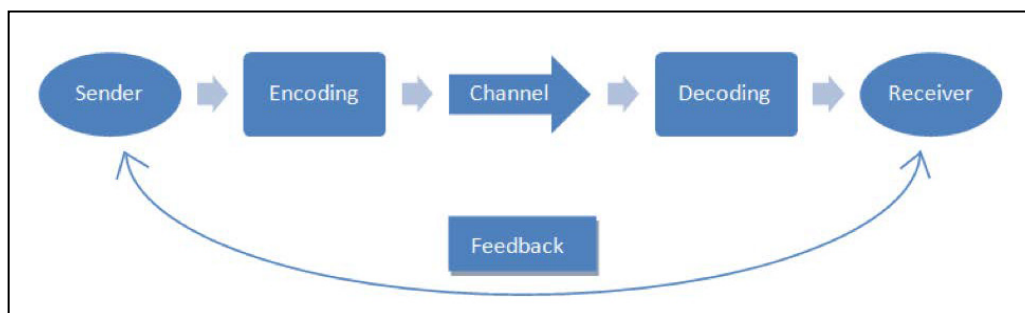


Fig 3.1.1 Communication process

- Components of communication
- Types of communication - Verbal and non-verbal communication
- Components of non-verbal communication

Explain

- Components of effective communication
- Ways of effective communication
- Ways to improve verbal communication
- Importance of non-verbal communication for an effective communication

Do

- Show do's and don'ts during verbal and non-verbal communication
- Show how to observe others body language

Team Activity

- Ask the students to assemble together.
- Tell the trainees to make pairs and plan a communication on any topic.
- Each pair has to communicate together for 5 minutes in front of class.

Skill Practice	Time	Resources
Effective communication between 2 persons	1 hour	Communication tools

Do

- Ask them to get into pairs for practice and do some casual conversation.
- Go around and make sure they are doing it properly.
- Praise them for their efforts.

Say

- Now, we discuss about ways of communication i.e. listening, writing, reading and speaking
- Active listening is one of the important skill of our communication process but many time as a communicator we spend our energy on what we wanted to say and not much focusing on what the other party wanted to say.
- Writing forms an important form of communication. A better writing skill allows our messages to be communicated effectively with clarity.

Elaborate

Elaborate and discuss below points with trainees

- Listening and its importance during communication
- Ways to be an effective listener
- Tips for listening
- Writing
- Do's and don'ts of written communication
- Tips for written communication

Do

- Show them how to listen attentively others.
- Show how to write appropriately.

Activity

- Ask the students to assemble together.
- Call 3 students.
- Give a student a written piece. Ask him to read it out loudly to the other 2 students.
- Provide one student with earphones to listen to music while listening to the information.
- Let the other person listen to it without any distraction.

- At the end of the reading, ask both the student to tell what has been read out.
- As a matter of fact we would find out that the person who has put all his attention in listening would yield better results in comparison to the other one.

Explain



Discuss with the students the importance of being an active speaker in a debate where counter questioning is allowed.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 3.2: Working Effectively and Maintaining Discipline at Work

Unit Objectives

At the end of this unit, trainees will be able to:

1. Discuss the importance of following organizational guidelines for dress code, time schedules, language usage and other behavioural aspect
2. Explain the importance of working as per the workflow of the organization to receive instructions and report problems
3. Explain the importance of conveying information/instructions as per defined protocols to the authorised persons/team members
4. Explain the common workplace guidelines and legal requirements on non-disclosure and confidentiality of business-sensitive information
5. Describe the process of reporting grievances and unethical conduct such as data breaches, sexual harassment at the workplace, etc.
6. Discuss ways of dealing with heightened emotions of self and others.

Resources to be Use

- Available objects such as white board, marker pens, duster.
- PC with LCD Projector or Flip Chart

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Discipline is essential for organizational success. It helps improve productivity, reduce conflict and prevent misconduct in the workplace. It is important to have rules concerning workplace discipline and ensure that all employees comply with them.
- Most of the organizations usually formulate set of policies, principles and disciplinary standards to reach long term goals.
- Maintaining an organized and cohesive workforce requires maintaining discipline in both personal and professional behaviors. It is important to follow the appropriate measures to keep employees in line without affecting their morale.

Ask

- What is the need of discipline at work?
- What is the need of organization policies and procedures?

Elaborate

Elaborate and discuss below points with trainees

- Benefits of disciplinary standards
- Benefits of organizational policies & procedures
- Common workplace policies
- How to work in line with organization policies & procedures

Say

- Conflict can be defined as a serious disagreement or argument.
- Conflict exist in almost all organization and some time it is also consider positive as it helps in healthy exchange of ideas and creativity.
- Unsolved problems may lead to increased levels of bitterness and frustration. By deciding not to say something that would make you sound aggressive or frustrated, you can avoid unnecessary conflicts.

Elaborate

Elaborate and discuss following topics:

- Reasons for workplace conflicts
- Types of interpersonal conflict
- Ways to resolve interpersonal conflicts

Activity

- Call out a student randomly.
- Ask them to narrate an incident when they had a fight with their friend and it resulted in further problems in school, became a cause for mental stress.

Explain

- Explain the importance of resolving conflicts for a person's mental peace, maintaining order and healthy environment in workplace.

Say

- Workflow is the order of steps from the beginning to the end of a task or work process.
- Workflows can help simplify and automate repeatable business tasks, helping improve efficiency and minimise the room for errors. With workflows in place, managers can make quick and smart decisions while employees can collaborate more productively.

Elaborate

Elaborate and discuss below points with trainees

- Benefits of maintaining workflow
- Following instructions and reporting problems
- Organisational policies on information or data sharing

Say

- It is extremely important to report issues right away to HR department, no matter how minor it may be.
- Reporting of issues is required under the Work Health and Safety (WHS) legislation.
- For escalating issues to the concerned department, every organization follows a specific procedure.

Elaborate

Elaborate and discuss following topics:

- Escalation matrix is a complaint logging system (complaint box) allows you to specify multiple user contacts to be notified in the event of issues. By using escalation matrix, you can notify the right people at the right time about critical alerts irrespective of the business hours.
- Key features of escalation matrix

Say

- Humans are emotional beings. There may be occasions when one is overwhelmed by emotions and is unable to suppress them. However, there may be situations when one must manage emotions well, particularly at work.
- So, there are some ways which can support us in dealing with emotions and mental stress during at work.

Elaborate

Elaborate and discuss following topics:

- Effect of emotions and stress on our mental health and daily life
- Ways to handle emotions and stress

Activity

- Call out few trainees randomly.
- Ask them to some narrate instances of coronavirus pandemic when they feel some mental stress and how it effects their life.
- Look for other such instances also in their life.

Explain

- Explain the importance and ways of managing stress for mental peace, maintaining order and healthy environment in workplace on the basis of their experiences shared in activity.

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 3.3: Maintaining Social Diversity at Work

Unit Objectives

At the end of this unit, trainees will be able to:

1. Explain the concept and importance of gender sensitivity and equality
2. Discuss ways to create sensitivity for different genders and Persons with Disabilities (PWD)

Resources to be Use

- Available objects such as white board, marker pens, duster.
- PC with LCD Projector or Flip Chart

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Each colleague plays an important role in the success of the organization.
- We communicate with people many times every day, either face to face, on the phone or in writing. When communicating with someone with disability, it is important to treat them like others but keeping some points in mind, so that they cannot hurt due to their disability.
- Similarly when communicating with different gender person, we need to consider some points at workplace, so that it can shows any discrimination due to different gender.

Ask

- What is gender and PwDsensitivity?
- What are the ways to reduce Gender Discrimination?

Elaborate

Elaborate and discuss below points with trainees

- Ways to reduce to reduce gender discrimination
- Barriers in communication with different gender

- Differences between male and female communication style in workplace
- Ways to communicate with different gender people
- Ways to be PwD Sensitive
- Ways to communicate with PwD

Explain



- Differences between male and female communication style in workplace
- Six principles of gender responsive communication
- Common mistakes during communication with different gender

Do



- Show them how to communicate properly with PwD
- Show them how to communicate properly with different gender

Team Activity



- Ask the students to assemble together.
- Tell the trainees to make 6 groups and plan a role play on communication on any topic.
- Each group has to present the role in front of class.

Skill Practice	Time	Resources
Effective communication topic with different gender and PwD	3 hours	Communication tools

Do



- Support them in preparing role play.
- Go around and make sure they are doing it properly.
- Praise them for their efforts.



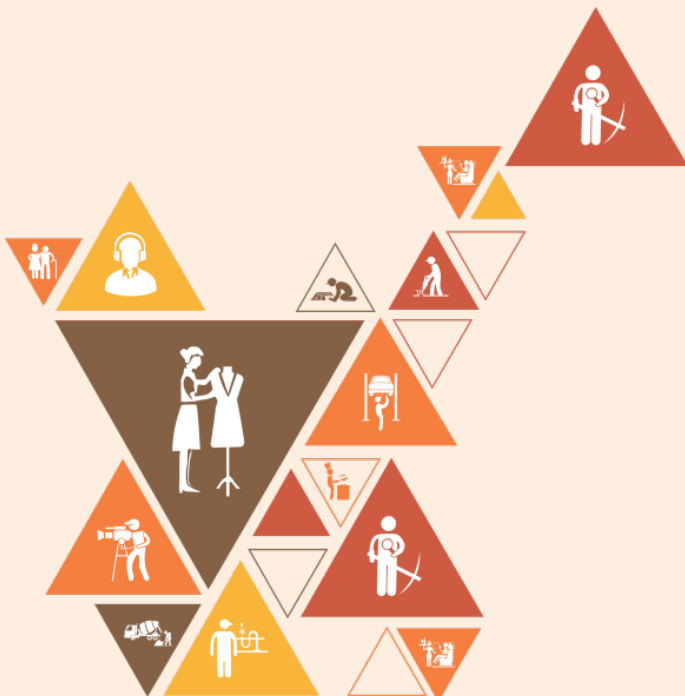
4. Basic Health and Safety Practices

Unit 4.1 - Workplace Hazards

Unit 4.2 – Fire Safety

Unit 4.3 – First Aid

Unit 4.4 – Waste Management



Key Learning Outcomes

At the end of this module, trainees will be able to:

1. Discuss job-site hazards, risks and accidents
2. Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials
3. Describe how to interpret warning signs while accessing sensitive work areas
4. Explain the importance of good housekeeping
5. Describe the importance of maintaining appropriate postures while lifting heavy objects
6. List the types of fire and fire extinguishers
7. Describe the concept of waste management and methods of disposing of hazardous waste
8. List the common sources of pollution and ways to minimize them
9. Elaborate on electronic waste disposal procedures
10. Explain how to administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning and also administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock

Unit 4.1: Workplace Hazards

Unit Objectives

At the end of this unit, trainees will be able to:

1. Discuss job-site hazards, risks and accidents
2. Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials
3. Describe how to interpret warning signs while accessing sensitive work areas
4. Explain the importance of good housekeeping
5. Describe the importance of maintaining appropriate postures while lifting heavy objects
6. Explain safe handling of tools and Personal Protective Equipment to be used.

Resources to be Use

- Available objects such as white board, marker pens, duster, PPE.
- PC with LCD Projector or Flip Chart
- Participant Manual

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- The health and safety of employees is crucial since it affects both economic and social factors.
- If the workers in the organization feel safe they can work with their full capabilities and potential and it also reflect positivism in the working environment.
- Measures needs to be taken to eliminate risks at work and ensure a safe and comfortable environment for the employees.

Ask

Ask these questions to trainees:

- What are the important aspects of safety in industry?
- List essential elements necessary for safety.
- What are the good safety practices?

Elaborate



Elaborate and discuss below points with trainees

- Importance of safe & secure working place.
- Benefits of workplace safety
- Preventative procedures need to follow.

Say



- A hazard is something that has the potential to cause injury, disease or death in a workplace.
- Aspects for the development of a safe workplace environment are development policies, consultative process, hazard identification and control.
- Always follow safety signages to ensure safety at workplace and ensure the control measures.

Ask



Ask these questions to trainees:

- List different types of hazard.
- You can pick the students and ask the hazard warning sign.
- What are the most common hazards in a electronics workshop?

Elaborate



Elaborate and discuss below points with trainees

- Hazard
- Categories of hazard
- Types of hazard
 - ✓ Physical hazard
 - ✓ Chemical hazard
 - ✓ Biological hazard
 - ✓ Phycological hazard
 - ✓ Electrical hazard
- Common causes of hazard
- Control measures of workplace hazards

Do

- Show all the hazard warning sign and their differences.
- Ask the various techniques to avoid and control from hazards.
- Give trainees some time to think about effects of hazard on our body.

Activity

- Ask the students to assemble together.
- Show the hazard signage chart to trainees and tell them to identify hazard signages one by one.
- By this activity, they will learn about different hazard signages paced at workplace.

Skill Practice	Time	Resources
Identify hazards signage	20 min	Hazard signage chart

Do

- Call each student one by one and ask him/her to identify the name of hazard sign showing on the chart.

Say

- Housekeeping includes keeping work areas tidy and arranged; keep floors free of slip and trip accidents; clearing of waste materials and other fire hazards.
- Good housekeeping is a basic step for preventing accident and fire hazards. Poor housekeeping and hiding hazards can cause frequent accidents which can cause injuries. The great majority of all work accidents are caused during the handling of goods or materials, and by people falling, being hit by falling objects, or striking against objects in the workplace. All these causes can be reduced by good housekeeping practices.
- Examples of housekeeping are - excessive material, waste or chips in the working area, congested aisles, tools left on machines, waste containers overflowing, lockers and workrooms in disorder, acids in open containers, broken glass etc.

Ask

Ask these questions to trainee:

- What are the housekeeping concerns in electronics industry?
- What are the areas and objects need to take care under effective housekeeping program in an industry?

Elaborate



Elements of housekeeping programme checklist are:

- Buildings
- Floors
- Aisles
- Machinery and equipment
- Stock and material
- Tools
- Grounds
- Waste disposal

Explain



- Explain principle of housekeeping.
- Explain benefits of housekeeping.
- Explain the checklist of housekeeping program.

Say



- Every worker has to lift and move heavy weight during the job whenever required. He/She may be required to move the job manually or by using forklift.

Elaborate



When moving materials manually, probable injuries occur are:

- Strains and sprains
- Fractures caused due to struck by materials
- Cuts caused on body due to falling objects.

A load may be hazardous because of:

- weight
- shape
- size
- slippery or damaged surfaces
- imbalance
- inappropriate handle

Do

- Show them how to lift the small weight safely.
- Show them different heavy weight lifting equipment available in industry.
- Explain the points to be taken care of while lifting / moving material

Demonstrate

Take the trainees into workshop and demonstrate the safe lifting of heavy material manually

Say

- There are safe practices need to be consider for avoiding general workshop hazards.
- Use of personal protective equipment is the first step towards the safety. Personal protective equipment serves as the last resort for controlling hazards and is one, but not the only, ancillary or temporary measure.

Ask

Ask these questions to trainees:

- What are the safe practices for avoiding general shop hazards?
- List type of PPE is required during work?
- What are the benefits of PPE at workplace?

Elaborate

Elaborate and discuss below points with trainees

- Safe practices to avoid workshop hazards
- Safe practices while using tools and power tools
- Personal protective equipment and their use.

Do

- Show them the PPE.
- Demonstrate the use and requirement of PPE.

Field Visit



Plan a visit in the industry and show PPE used and safe working practices followed in the industry.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 4.2: Fire Safety

Unit Objectives

At the end of this unit, trainees will be able to:

1. List the types of fire and fire extinguishers

Resources to be Use

- Available objects such as white board, marker pens, duster, different types of fire extinguisher, fire alarm, PPE, sample emergency plan and first-aid kit.
- PC with LCD Projector or Flip Chart
- Participant Manual

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Fire is defined as a self-sustaining combustion process in which a substance (fuel) combines with oxygen in air to produce immense heat and light.
- Fire hazards pose threats to life and property.
- There are four classes of fire i.e. Class A, Class B, Class C and Class D.
- A fire extinguisher is an active fire protection device used to extinguish or control small fires, often in emergency situations.

Ask

- What is fire?
- What are the common types of fire safety equipment used in industry?
- What is fire extinguisher and how you can use it?

Elaborate

Elaborate and discuss below points with trainees

- Fire and types of fire
- Ways and effects of fire hazard
- Emergency instructions in case of fire
- Ways for fire prevention
- Types of fire extinguisher, their color codification and classification according to classes of fire
- Use of fire extinguisher

Do

- Show them the equipment and explain their use.
- Demonstrate them the use of fire extinguisher.
- Explain them about different types of fire extinguishers.

Demonstrate

- Take the trainees into the workshop.
- Demonstrate the steps of using fire extinguisher.

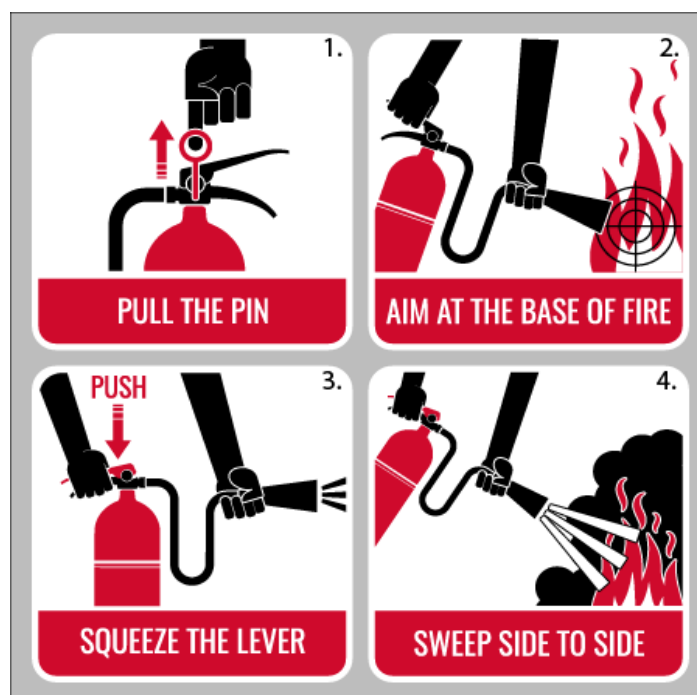


Fig 6.2.1 Using a fire extinguisher

Activity



- Ask the students to assemble together.
- Tell them to demonstrate the use of fire extinguisher one by one.
- By this activity, they will learn about use of fire extinguisher.

Skill Practice	Time	Resources
Use of fire extinguisher	2 Hours	Fire extinguisher, PPE

Do



- Provide one by one a fire extinguisher to each trainee
- Support them in using a fire extinguisher properly.
- Go around and make sure they are doing it properly.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

Unit 4.3: First Aid

Unit Objectives

At the end of this unit, trainees will be able to:

1. Explain how to administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning
2. Explain how to administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock.

Resources to be Use

- Available objects such as white board, marker pens, duster, first-aid kit.
- PC with LCD Projector or Flip Chart
- Participant Manual

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- First aid is the treatment or care given to someone who has sustained an injury or disease until more advanced care can be obtained or the person recovers. If you think someone is suffering from electric shock, approach with extreme caution and it's your duty to give the basic first aid to save the life of victim.

Ask

- What is the need and aim of first aid?
- What are the basic steps of first aid?

Demonstrate

You can make a group of few trainees to demonstrate the steps of first-aid in following situations:

- Free a person from electrocution
- Bleeding and Wounds
- Treating Minor Cuts and Scrapes
- Choking
- First aid in case of heart attack
- Basic techniques of banding

Activity

- Ask the students to assemble together.
- Tell them to divide into six groups.
- Tell them to prepare a role play of an accident and demonstrate the first-aid steps need to perform for saving the victim.

Skill Practice	Time	Resources
First-aid practices	3 Hours	Mannequin, first-aid box

Do

- Support the teams in preparation of role play
- Praise their effort during the demonstration.
- Wrap the unit up after summarizing the key points and answering questions.

Field Visit

Plan a visit to any of the industry and show the firefighting equipment. With the help of field visit show the trainees where we need to various firefighting equipment and how to use them.

Show them fire drill session. With the help of field visit explain them the importance of fire drill for safety.

Unit 4.4: Waste Management

Unit Objectives

At the end of this unit, trainees will be able to:

1. Describe the concept of waste management and methods of disposing of hazardous waste.
2. List the common sources of pollution and ways to minimize them.
3. Elaborate on electronic waste disposal procedures.

Resources to be Use

- Available objects such as white board, marker pens, duster
- PC with LCD Projector or Flip Chart

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Waste management is the collection, transport, processing, recycling or disposal of waste materials.
- Waste may be classified as garbage, rubbish, industrial wastes, mining wastes etc.
- **Industrial waste can be of following types:** liquid waste, solid waste, organic waste, recyclable rubbish and hazardous waste.

Ask

- What are the elements of waste management strategy?
- What are the different methods of waste management?

Explain

- Explain different types of industrial waste.
- Explain different methods of waste management.

Field Visit



Arrange a visit to any of the automobile industry and show the waste management system and how they do the segregation of waste.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Share your inputs and insight to encourage the trainees.
- Wrap the session up after summarizing the key points and answering questions.

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Scan the QR code or click on the link to watch related videos



<https://www.skillindiadigital.gov.in/content/list>
Employability skills (60 hours)

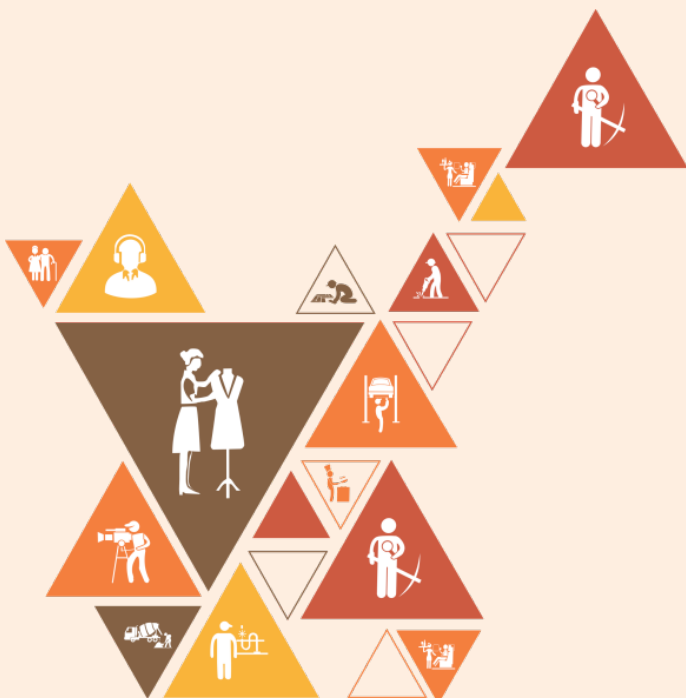


6. Annexures

Annexure I - QR Codes

Annexure II - Training Delivery Plan

Annexure III - Assessment Criteria



ANNEXURE - QR Codes

S.No.	Chapter No.	Unit No.	Topic Name	Page No.	QR code(s)	URL
1	Chapter 1: Introduction and orientation to the role of a PCB Assembly Operator	Unit 1.1 – Size and scope of the electronics industry and its various subsectors	Size and scope of the electronics industry and its various sub- sectors	7		https://www.youtube.com/watch?v=A8LSc-2GXn9E
2			Career Pathways of Electrical Assembly Operator	7		https://www.youtube.com/watch?v=i-6vam-FveBc
3			Job Description: PCB Assembly Operator	7		https://www.youtube.com/watch?v=usmDf-GM2KmU
4	Chapter 2: Process of assembling printed circuit board (PCB)	Unit 2.1 - Assembly Work Flow	Work flow involved in assembly process	30		https://www.youtube.com/watch?v=j4-zlBl-okE
5			Fundamentals of electricity	30		https://www.youtube.com/watch?v=uR-5wIYCEVaM
6			Basic electronics components	30		https://www.youtube.com/watch?v=4sB-gu_tUpil

S.No.	Chapter No.	Unit No.	Topic Name	Page No.	QR code(s)	URL
7			Various assembly processes such as thru-hole technology (THT), surface mount technology	30		https://www.youtube.com/watch?v=RW9N-O6H62oY
8			List color codes and polarity of components	30		https://www.youtube.com/watch?v=bBX-2KAHisyo
9			Comparison between ROHS & Non-ROHS compliant solder	30		https://www.youtube.com/watch?v=wx-9aszQZ6uE
10	Employability skills (60 hours)	Employability skills (60 hours)	Employability skills (60 hours)	60		https://www.skillindia.digital.gov.in/content/list

Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	PCB Assembly Operator		
Qualification Pack Name & Ref. ID	PCB Assembly Operator & ELE/Q7804		
Version No.	3.0	Version Update Date	27-06-2025
Pre-requisites to Training (if any)	8th grade pass with 2 years of NTC (plus 2 year of NAC/relevant experience) OR 10th grade pass (plus 2 year of NTC/NAC/relevant experience) OR 12th Class OR Certificate-NSQF (level 3 in Maintenance Technician) with 2 Years of experience		
Training Outcomes	By the end of this program, the participants will be able to: 1. Demonstrate the process of assembling Printed Circuit Board (PCB). 2. Explain the importance of following inclusive practices for all genders and PwD at work. 3. Demonstrate various practices to be followed to maintain health and safety at work.		

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration
1	Introduction and orientation to the role of a PCB Assembly Operator	Icebreaker	• Introduce each other • Build rapport with students • Describe the size and scope of the electronics industry and its sub-sectors.	Bridge Module	• Group Activity: Passing the Parcel	Whiteboard/ Markers, Computer, Projector, screen	T:4:00 P:2:00
		Sub-Sectors of the Electronics industry	• List various sub-sectors of electronics industry • Describe the size and scope of each sub-sector	Bridge Module	• Class-room lecture • Presentation	White board/ black board marker/chalk, computer with projector	T:4:00 P:4:00
		Opportunities for PCB Assembly Operator	• List opportunities for PCB Assembly Operator in electronics industry	Bridge Module	• Class-room lecture • Presentation	White board/ black board marker/chalk, computer with projector	T:4:00 P:4:00
		Roles and responsibilities of a PCB Assembly Operator	• Describe roles and responsibilities of a PCB Assembly Operator	Bridge Module	• Class-room lecture • Presentation	White board/ black board marker/chalk, computer with projector	T:4:00 P:4:00

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration
2	Process of assembling printed circuit board (PCB)	Printed circuit board (PCB)	- Describe PCB - List various types of PCB - Describe features of each type of PCB	ELE/N7812 KU1, KU2	- Classroom lecture - Presentation - Demonstration	White board/black board marker/ chalk, computer with projector, PCB	T:6:00 P:2:00
		Work flow involved in assembly process	State the work flow involved in assembly process of the company and one's role in the work flow.	ELE/N7812 PC1, KU1, KU2	- Class-room lecture - Presentation - Demonstration	Electronic components, PPT, Video	T:4:00 P:4:00
		Stages of PCB development process	- Describe stages of PCB development process - Explain each stage of PCB development process	ELE/N7812 PC1, PC2, GS1	- Classroom lecture - Presentation - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:5:00 P:3:00
		PCB design process - 1	- List steps of PCB development process - Describe process of each step of PCB development	ELE/N7812 PC1, PC2, GS2	- Classroom lecture - Presentation - Demonstration	White board/black board marker/ chalk, computer with projector, PCB	T:2:00 P:6:00
		PCB design process - 2	- Describe process of each step of PCB development - Describe various design issues in PCB design	ELE/N7812 PC1, PC2	- Classroom lecture - Presentation - Demonstration	White board/black board marker/ chalk, computer with projector, PCB	T:2:00 P:6:00
		PCB design process - 3	- Describe process of each step of PCB development - List various development tools for PCB layout development - Demonstrate use of development tools for layout designing	ELE/N7812 PC1, PC2	- Classroom lecture - Presentation - Demonstration - Activity	White board/black board marker/ chalk, computer with projector, PCB	T:2:00 P:6:00
		Preparation for PCB building	- List preparatory activities for PCBA - Demonstrate preparatory activities of PCBA	ELE/N7812 PC1, PC2, PC3, PC4, KU3, KU4, GS3	- Classroom lecture - Presentation - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:3:00 P:5:00
		PCB Assembly process	- Describe PCBA process - Demonstrate preparatory activities for PCBA process	ELE/N7812 PC5, PC6, GS4	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Thru-Hole Technology (THT) Assembly Process	- Describe Thru-Hole Technology (THT) Assembly Process - Demonstrate steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC7, PC8, KU6	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Surface Mount Technology (SMT) Assembly Process	- Describe Surface Mount Technology (SMT) Assembly Process - Demonstrate steps of Surface Mount Technology (SMT) Assembly Process	ELE/N7812 PC7, PC8, KU6	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Mixed Technology	- Describe Mixed Technology Assembly Process - Demonstrate steps of Mixed Technology Assembly Process	ELE/N7812 PC7, PC8, KU6	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Perform PCBA	- List steps to be performed for PCBA Process - Demonstrate steps of PCBA Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration
		Practice 1 - PCBA	Practice steps of PCBA Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Practice 2 - PCBA	Practice steps of PCBA Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Basics of electronics	- Describe basic concepts of electronics - Describe flow of electrons in a circuit	ELE/N7812 KU5	- Class-room lecture - Presentation	White board/ black board marker/chalk, computer with projector	T:4:00 P:4:00
		Circuit	- Describe circuit - Describe ohm's law - Describe different types of circuit	ELE/N7812 KU5	- Class-room lecture - Presentation	White board/ black board marker/chalk, computer with projector	T:4:00 P:4:00
		Electronic components -1	- List various electronics components - Describe functioning of each electronics components	ELE/N7812 KU5, KU7	- Class-room lecture - Presentation	PPT, Electronic components	T:4:00 P:4:00
		Electronic components -2	- List various electronics components - Describe functioning of each electronics components	ELE/N7812 KU5, KU7	- Class-room lecture - Presentation	PPT, Electronic components	T:4:00 P:4:00
		Thru-Hole Technology (THT) Assembly Process	- Describe Thru-Hole Technology (THT) Assembly Process - Demonstrate steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Practice 1 - Thru-Hole Technology (THT) Assembly Process	Practice steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Practice 2 - Thru-Hole Technology (THT) Assembly Process	Practice steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Surface Mount Technology (SMT) Assembly Process	- Describe Surface Mount Technology (SMT) Assembly Process - Demonstrate steps of Surface Mount Technology (SMT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Practice 1 - Surface Mount Technology (SMT) Assembly Process	Practice steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration
		Practice 2 - Surface Mount Technology (SMT) Assembly Process	Practice steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Mixed Technology	- Describe Mixed Technology Assembly Process - Demonstrate steps of Mixed Technology Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Practice 1 - Mixed Technology	Practice steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Practice 2 - Mixed Technology	Practice steps of Thru-Hole Technology (THT) Assembly Process	ELE/N7812 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Safety and quality standards	- List safety and quality standards followed in industry - Discuss methods of electrical safety	ELE/N7812 KU8, KU9	- Classroom lecture - Presentation	PPE, IEC manual	T:2:00 P:6:00
		Soldering	- Describe soldering process - Describe soldering parameters - Describe features of soldering process	ELE/N7812 PC9, PC10, KU10, KU11, GS5	- Classroom lecture - Presentation	PPT, Video	T:2:00 P:6:00
		Soldering process requirements	- List requirements for soldering parameters - Demonstrate use of tools and equipment required	ELE/N7812 PC9, PC10, KU12	- Classroom lecture - Presentation - Demonstration	Soldering equipment and material	T:2:00 P:6:00
		Soldering process	- List requirements for soldering parameters - Demonstrate soldering process	ELE/N7812 PC9, PC10	- Classroom lecture - Presentation - Demonstration	Soldering equipment and material	T:2:00 P:6:00
		Practice 1- Soldering process	Practice soldering process	ELE/N7812 PC9, PC10	- Demonstration - Activity	Soldering equipment and material	P:8:00
		Practice 2- Soldering process	Practice soldering process	ELE/N7812 PC9, PC10	- Demonstration - Activity	Soldering equipment and material	P:8:00
		PCB Testing - Functional testing	- Describe Functional testing of PCB - Demonstrate Functional testing of PCB	ELE/N7812 PC11, PC12, PC13, KU13, GS6	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	T:2:00 P:6:00
		Troubleshooting of PCB	- List bench instruments required for troubleshooting of PCB - Demonstrate troubleshooting of PCB	ELE/N7812 PC11, PC12, PC13, KU13	- Classroom lecture - Demonstration	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits, multimeter, signal generator, oscilloscope	T:2:00 P:6:00
		Practice 1 - PCB testing	Practice all methods of PCB testing	ELE/N7812 PC11, PC12, PC13	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration
		Practice 2 - PCB testing	Practice all methods of PCB testing	ELE/N7812 PC11, PC12, PC13	- Demonstration - Activity	Development Kits (DKs), Evaluation Kits (EVKs), Testing kits	P:8:00
		Organisational reporting structure	- Discuss organisational reporting structure - Discuss need of organisational reporting structure	ELE/N7812 PC14, PC15, KU14	- Classroom lecture - Presentation - Demonstration	PPT, Video	T:2:00 P:2:00
3	Soft Skills and Work Ethics	Communication skills	- Describe workplace etiquette - Define Communication Skills - Elaborate process of communication - List components of communication	ELE/N9905 PC1, PC2, PC3, PC4, KU1, KU2, KU3, KU4, KU5, KU6, KU7, GS1, GS2, GS3	- Classroom lecture - Presentation - Activity	White board marker, duster, computer or Laptop attached to LCD projector	T:2:00 P:4:00
		Verbal and non-verbal communication	- Define verbal communication and its importance - List ways to improve verbal communication - List components of non-verbal communication - State importance of body language	ELE/N9905 PC5, PC6, PC7, PC8, PC9, PC10 KU8, KU9, KU10, GS4, GS5, GS6, GS7, GS8	- Classroom lecture - Presentation - Activity	White board marker, duster, computer or Laptop attached to LCD projector	T:2:00 P:4:00
		Working Effectively at Work	Explain the importance of working as per the workflow of the organization to receive instructions and report problems	ELE/N9905 PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18,	- Classroom lecture - Presentation - Activity	White board marker, duster, computer or Laptop attached to LCD projector	T:2:00 P:4:00
		Maintaining Discipline at Work	- Describe the process of reporting grievances and unethical conduct - Discuss ways to resolve conflicts at workplace Explain the importance of conveying information/ instructions as per defined protocols to the authorised persons/team members	ELE/N9905 PC19, PC20, PC21, PC22, PC23, PC24, PC25, KU14, KU17, KU18 KU11, KU12, KU13, GS9, GS10, GS11, GS12, GS13, GS14	- Classroom lecture - Presentation - Activity	White board marker, duster, computer or Laptop attached to LCD projector	T:2:00 P:4:00
		Communication with PwD and different gender	- Discuss the importance of PwD and gender sensitization. - Demonstrate ways to communicate with PwD - Demonstrate ways to communicate with different gender people	ELE/N9905 PC26, PC27, PC28, PC29, PC30, KU15, KU16, GS15, GS16, GS17, GS18	- Classroom lecture - Presentation - Activity	White board marker, duster, computer or Laptop attached to LCD projector	T:2:00 P:4:00

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
4	Basic Health and Safety Practices	Workplace Hazards	- Elaborate importance of safety at workplace - List the potential workplace related risks and hazards, their causes and preventions.	ELE/N1002 PC1, PC2, PC7 KU1, KU2, KU3, KU4, KU5, KU6, KU7, KU13	- Classroom lecture - Presentation - Demonstration - Activity	White board, duster, computer, LCD projector, PPE, warning signs	T:2:00 P:4:00
		Safe Working Practices	- Identify safety measures during work - Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc.	ELE/N1002 PC3, PC4, PC5, PC6, PC8, PC9 KU8, KU9, KU10, KU11, KU12, KU14, KU15, KU16, KU27, KU28, KU29, KU30, KU31, KU32, GS1, GS2, GS3, GS4, GS5	- Classroom lecture - Presentation - Demonstration - Activity	White board/black board marker/ chalk, duster, computer or Laptop attached to LCD projector, PPE	T:2:00 P:4:00
		Fire Safety	- Discuss the causes of fire at the shop floor; - Demonstrate steps of emergency procedures	ELE/N1002 PC10, PC11, PC12, KU17, KU18, KU19, KU20, KU21, KU22, KU23, G6, GS7, GS8, GS12, GS13, GS14, GS15	- Classroom lecture - Presentation - Demonstration - Activity	Fire extinguisher and first aid kit	T:2:00 P:4:00
		First Aid	Demonstrate basic first aid techniques	ELE/N1002 PC13, PC14, PC15, PC16 KU24, KU25, KU26, GS9, GS10, GS11	- Classroom lecture - Presentation - Demonstration - Activity	Fire extinguisher and first aid kit	T:2:00 P:4:00
		Waste Management	- Discuss various methods of waste management and its disposal - List the different categories of waste for the purpose of segregation - Demonstrate different disposal techniques depending upon different types of waste	ELE/N1002 PC17, PC18, PC19, PC20, PC21, KU33, KU34, KU35, KU36, KU37, KU38, KU39, GS16, GS17	- Classroom lecture - Presentation - Demonstration - Activity	Different type of waste bins to collect and segregate waste for disposal	T:2:00 P:4:00

Total duration of the course is 600 Hours

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for PCB Assembly Operator	
Job Role	PCB Assembly Operator
Qualification Pack	ELE/Q7804, v3.0
Sector Skill Council	Electronics

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training centre based on these criteria.
5	In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.
6	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack
7	Recommended Pass % - 70

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS 1: Assemble Printed Circuit Board (PCB) (ELE/N7812)				
Prerequisites to printed circuit board assembly	12	8	-	1
PC1. identify daily work requirements, including PCB design specifications, from supervisor	4		-	-
PC2. arrange the required tools for assembly of PCB such as wire cutter, pliers, soldering iron etc.	3	3	-	-
PC3. collect PCB board, electronic components and module software as per the requirement	3	-	-	-
PC4. inspect the board and components for any errors and get them rectified/replaced accordingly	2	5	-	1
Assemble PCB	28	42	-	9
PC5. mount the board on a holder or pallet to insert/install components appropriately	2	4	-	1
PC6. select the appropriate process to assemble the PCB	3	2	-	-
PC7. insert components into designated plated through-holes (PTH) as per the design	3	5	-	1
PC8. perform inspection and rectification of component placement errors, if any	3	5	-	1
PC9. inspect the soldering station before commencing soldering work so as to resolve related problems, if any	3	5	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. solder the components onto circuit board using the soldering station as per standard operating procedures (SOP)	3	5	-	1
PC11. analyse the assembled board with the help of magnifying glass for any missing components, wrong value components, dry soldering etc.	3	5	-	1
PC12. conduct functional test of PCB assembly to identify soldering related errors	3	5	-	1
PC13. rework to rectify soldering errors or any other identified error to make it pass through functional test	2	3	-	1
PC14. maintain documentation of the quantity and type of components assembled as well as software used for the purpose	2	3	-	1
PC15. deliver the assembled board to device assembly team on time	2	-	-	-
NOS Total	40	50	-	10
NOS 2: Work effectively at the workplace (ELE/N9905)				
Communicate effectively at the workplace	5	13	-	-
PC1. exchange information and instruction with colleagues, and seek clarifications and feedback as necessary	1	3	-	-
PC2. assist colleagues where required	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)	1	4	-	-
PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines	2	3	-	-
Work effectively	6	13	-	-
PC5. identify and obtain clarity regarding organisational, team and own goals and targets	1	2	-	-
PC6. prioritise and plan work in order to achieve goals and targets	1	2	-	-
PC7. monitor own and team performance as per agreed plan	1	2	-	-
PC8. complete duties accurately, systematically and within required timeframes	1	2	-	-
PC9. express emotions appropriately at the workplace and manage own response to heightened emotions	1	2	-	-
PC10. maintain orderliness and cleanliness in the work area	1	3	-	-
Maintain and enhance professional competence	8	7	-	-
PC11. identify own strengths and weaknesses in relation to goals and targets	1	1	-	-
PC12. adapt self, service, or product to meet success criteria	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. seek and select opportunities for continuous professional development	1	1	-	-
PC14. formulate a professional development plan to enhance capabilities	2	1	-	-
PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations	1	1	-	-
PC16. examine developments and trends in field of work and their potential impact on work	1	1	-	-
PC17. take feedback from peers, supervisors and clients to improve own performance and practices	1	1	-	-
Work in a disciplined and ethical manner	11	16	-	-
PC18. perform tasks as per workplace standards, organisational policies and legislative requirements	2	2	-	-
PC19. display appropriate professional appearance at the workplace and adhere to the organisational dress code	1	2	-	-
PC20. demonstrate responsible and disciplined behaviour at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behaviour at all times, adopting environment-friendly practices, etc.	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution	2	2	-	-
PC22. protect the rights of the client and organisation when delivering services	1	2	-	-
PC23. ensure services are delivered equally to all clients regardless of personal and cultural beliefs	1	2	-	-
PC24. operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities	2	2	-	-
PC25. follow organisational guidelines and legal requirements on disclosure and confidentiality	1	2	-	-
Uphold social diversity at the workplace	10	11	-	-
PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes	2	2	-	-
PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace	2	2	-	-
PC28. use inclusive or neutral language and gestures in all interactions	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC29. respect the personal and professional space of others	2	2	-	-
PC30. access grievance redressal mechanisms as per legislations	2	3	-	-
NOS Total	40	60	-	-
NOS 3: Apply health and safety practices at the workplace (ELE/N1002)				
Deal with workplace hazards	20	31	-	-
PC1. identify job-site hazards and possible causes of accident in the workplace	2	3	-	-
PC2. perform work complying to organizational safe working practices and observing hazard signs displayed on containers, equipment and in various work areas such as inside buildings, in open areas and public spaces, etc.	3	4	-	-
PC3. use appropriate personal protective equipment (PPE) for specific tasks and work conditions, contaminant (concentration w.r.t air) requirements and severity of hazard while conforming to the Indian/International standards	3	4	-	-
PC4. follow standard safety procedures while handling tool/ ,equipment, hazardous substances and while working in hazardous environments	3	4	-	-
PC5. dispose electronic waste (such as toxins; metals such as lead, cadmium, barium; flame retardant plastics, welding slag etc.) as per industry approved techniques	2	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC6. avoid damage of components due to negligence in electrostatic discharge (ESD) procedures	2	3	-	-
PC7. locate general health and safety equipment in the workplace such as fire extinguishers; first aid equipment; safety instruments, clothing and installations (fire exits, exhaust fans)	2	3	-	-
PC8. maintain appropriate posture while handling heavy objects	1	3	-	-
PC9. apply good housekeeping practices at all times	2	3	-	-
Apply fire safety practices	4	9	-	-
PC10. take preventive measures to prevent fire hazards	2	3	-	-
PC11. use appropriate fire extinguishers for different types of fires Types of fires: Class A - e.g. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B - flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C - e.g. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no l	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. exhibit rescue and first-aid techniques in case of fire or electrocution	1	3	-	-
Follow emergencies, rescue and first-aid procedures	6	13	-	-
PC13. administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.	1	3	-	-
PC14. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock	1	2	-	-
PC15. participate regularly in emergency procedures such as raising alarm, safe/efficient, evacuation, correct means of taking shelter and escaping, correct assembly point, roll call, correct return to work	2	4	-	-
PC16. use correct method to move injured people and others during an emergency	2	4	-	-
Effective waste management/ recycling practices	5	12	-	-
PC17. identify recyclable and non-recyclable, and hazardous waste generated	1	3	-	-
PC18. segregate waste into different categories	1	2	-	-
PC19. ensure disposal of non-recyclable waste appropriately	1	2	-	-
PC20. deposit non-recyclable and reusable material at identified location	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21. follow processes specified for disposal of hazardous waste	1	2	-	-
NOS Total	40	60	-	-
NOS 4: Employability Skills (60 Hours) (DGT/VSQ/N0102)				
Introduction to Employability Skills	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	1	1	-	-
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	2	4	-	-
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-

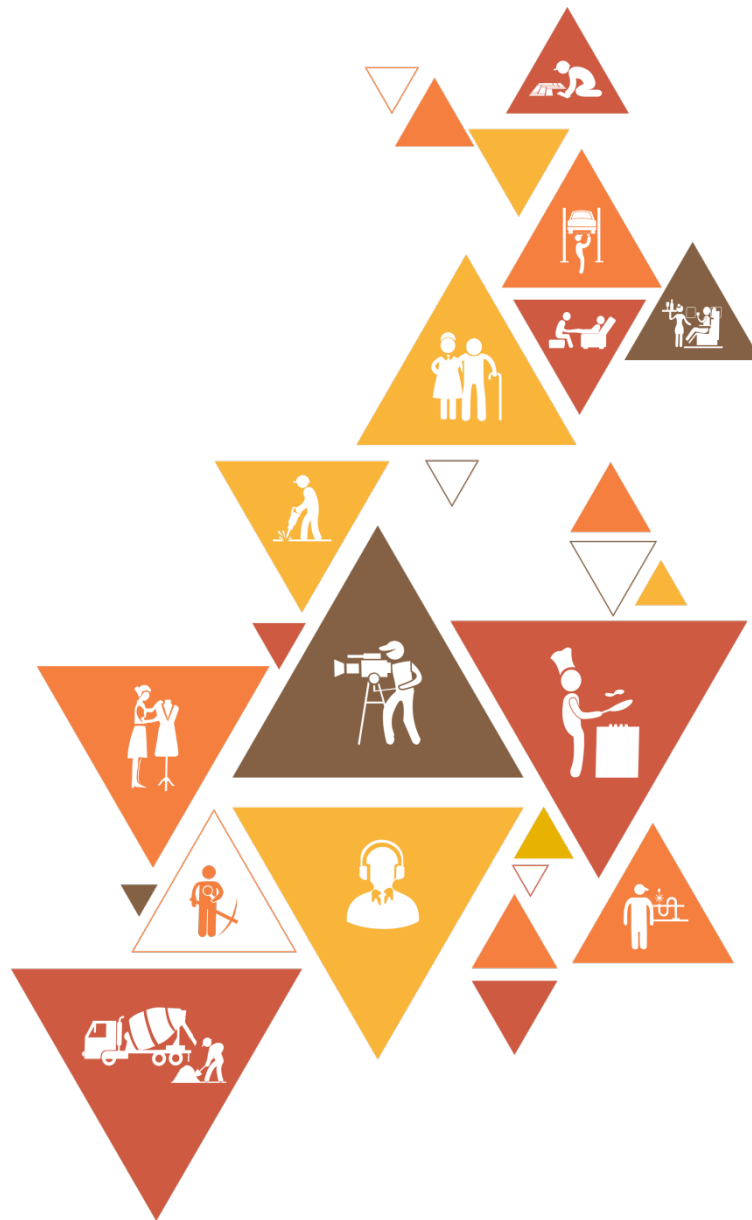
Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	2	3	-	-
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
Career Development & Goal Setting	1	2	-	-
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
Communication Skills	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Diversity & Inclusion	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
Financial and Legal Literacy	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
Entrepreneurship	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline/online methods as per requirement	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	20	30	-	-

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