Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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National
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Transforming the skill landscape

Telecom
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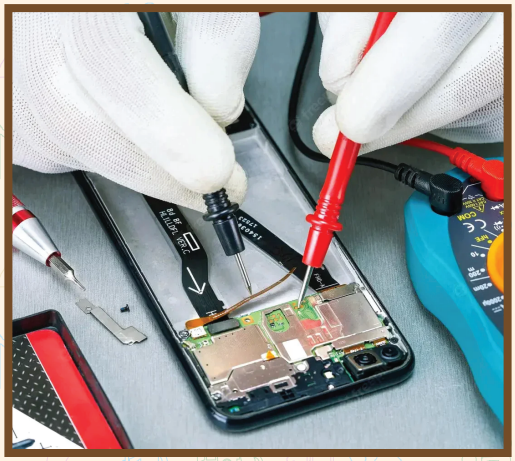
Facilitator Guide



Sector
Telecom

Sub-Sector
Passive Infrastructure

Occupation
Customer Service - Passive Infrastructure

Reference ID: TEL/Q4302, Version 1.0
NSQF level 4

Telecom Grameen Udhyami

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Telecom Sector Skill Council of India

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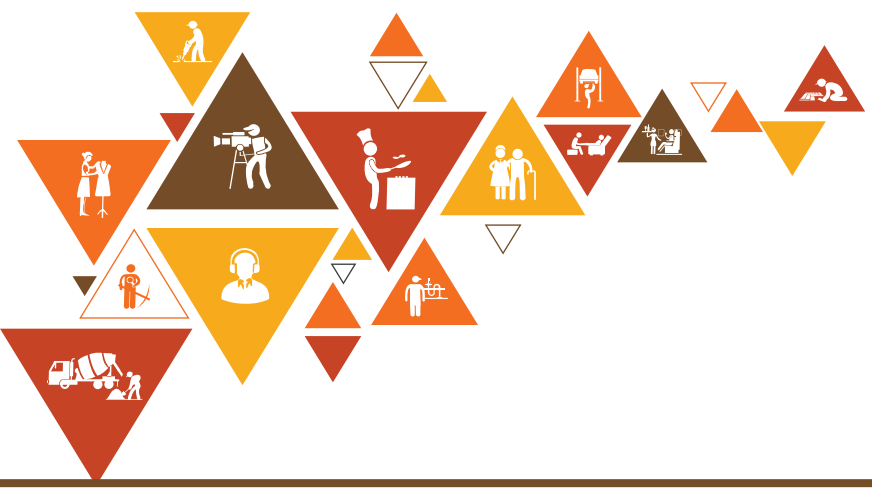


> Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.

Shri Narendra Modi
Prime Minister of India

Acknowledgements

The Telecom Sector Skill Council (TSSC) would like to thank all the individuals and institutions who contributed in various ways towards the preparation of this facilitator guide. The guide could not have been completed without their active contribution. Special gratitude is extended to those who collaborated during the development of the different modules in the facilitator guide. Wholehearted appreciation is also extended to all who provided peer review for these modules.

The preparation of this guide would not have been possible without the telecom industry's support. Industry feedback has been extremely beneficial since inception to conclusion, and it is with the industry's guidance that we have tried to bridge the existing skill gaps in the industry. This facilitator guide is dedicated to the aspiring youth, who desire to achieve special skills that will be a lifelong asset for their future endeavours.

About this Guide

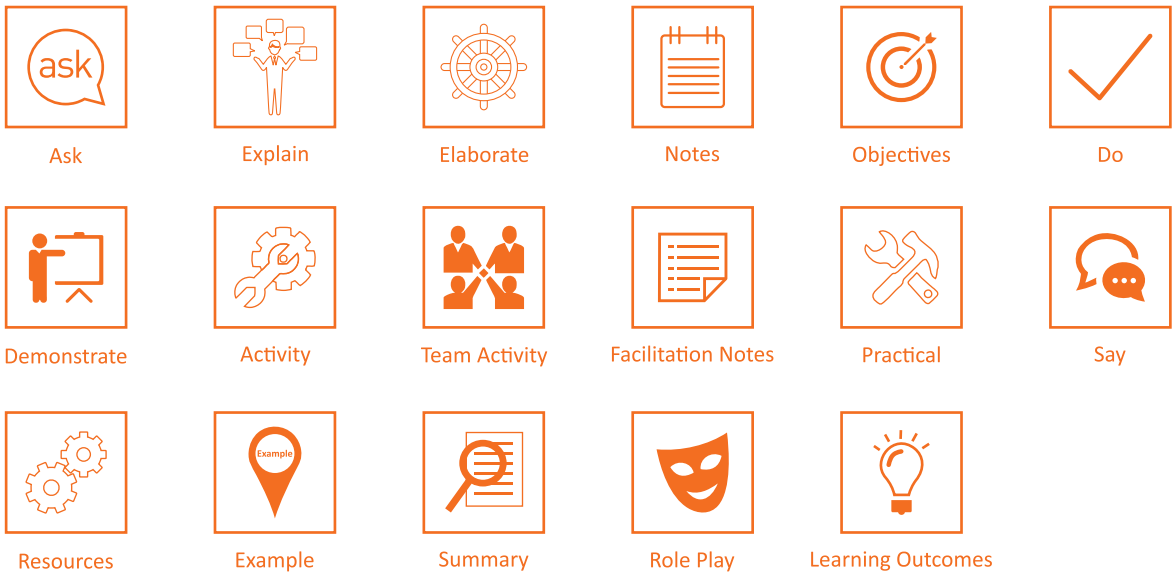
The facilitator guide (FG) for Telecom Grameen Udhyami is primarily designed to facilitate skill development and training of people, who want to become professional Telecom Grameen Udhyami in various stores. The facilitator guide is aligned to the Qualification Pack (QP) and the National Occupational Standards (NOS) as drafted by the Sector Skill Council (TSSC) and ratified by National Skill Development Corporation (NSDC).

It includes the following National Occupational Standards (NOSs)-

1. CON/N0602: Handle hand and power tools relevant to construction electrical works
2. TEL/N4122: Wiring and installing equipment at different sites
3. TEL/N6400: Splice Optical Fiber
4. TEL/N4201: In-building FTTH/X cabling
5. TEL/N0112: Configure customer premises equipment and establish Broadband connectivity
6. TEL/N0113: Troubleshoot and rectify faults
7. TEL/N2213: Repair and test handsets
8. TEL/N4141: Provide Techpreneurial Solutions in the Village
9. DGT/VSQ/N0102: Employability Skills (60 Hours)

Post this training, the participants will be able to perform tasks as professional Telecom Grameen Udhyami. We hope that this Facilitator Guide provides a sound learning support to our young friends to build a lucrative career in the Telecom Skill Sector of our country.

Symbols Used



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1. Introduction to the role of a Telecom Grameen Udhyami

Unit 1.1 - Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami

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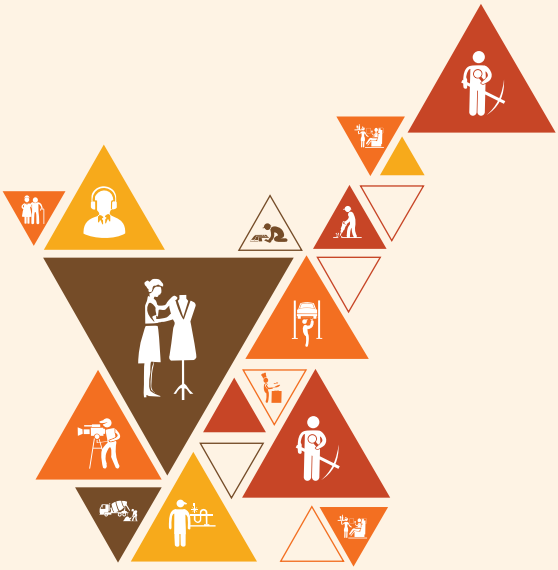


Bridge Module

Key Learning Outcomes 

By the end of this module, the participants will be able to:

1. Outline the Telecom industry's size and scope, including its sub-sectors, and explain the fundamentals and concepts of telecommunication and related terminologies.
2. Describe the role and responsibilities of a Telecom Grameen Udhyami (rural entrepreneur) and the impact they can have on promoting connectivity in rural areas.
3. List and explain the daily, weekly, and monthly operations and activities that take place under the purview of a Telecom Grameen Udhyami.
4. Analyze the career progression opportunities within the Telecom industry and identify potential paths for advancement for a Telecom Grameen Udhyami.
5. Assess the role of a Telecom Grameen Udhyami in fostering an entrepreneurial mindset in rural communities and promoting economic development.
6. Discuss organizational policies related to workplace ethics, managing telecom sites, quality standards, personnel management, and public relations within the Telecom industry.
7. Describe the workflow process in a telecom organization and elucidate the responsibilities of a broadband technician within this process.
8. Recall the fundamentals of optical fiber technology, its historical context, and the challenges faced during handling and installation.
9. Evaluate the working principle of optical fiber communication systems and analyze case studies outlining the role, responsibilities, and challenges a Telecom Grameen Udhyami faces in this context.
10. State the safety, health and environmental policies and regulations for the workplace as well as for telecom sites in general.

Unit 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami

Unit Objectives

By the end of this unit, the participants will be able to:

1. Describe the size and scope of the Telecom industry and its various sub-sectors.
2. Explain the fundamentals and concept of telecommunication and the terminologies used in the work process.
3. Explain the role and responsibilities of Telecom Grameen Udhyami.
4. List the various daily, weekly, and monthly operations/activities that take place under a Telecom Grameen Udhyami.
5. Discuss the organisational policies on workplace ethics, managing sites, quality standards, personnel management and public relations (PR).
6. Explain the role of Telecom Grameen Udhyami in encouraging an entrepreneurial mindset in the village.

Resources to be Used

Presentation slides on the Telecom Sector in India, handouts or visual aids explaining the sub-sectors of the telecom industry, examples of telecom equipment for demonstration purposes, case studies or success stories of telecom Grameen Udhyami, whiteboard and markers for interactive discussions

Say

- Hello everyone, and welcome to today's session on the Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami!
- Today, we'll dive into the intricacies of the Telecom Sector in India and understand the crucial role played by Telecom Grameen Udhyami in fostering connectivity and entrepreneurship in rural areas.
- Understanding the Telecom Sector and the role of Telecom Grameen Udhyami is essential in grasping the transformative power of telecommunications in bridging the urban-rural divide and empowering local communities.

Activity

1. **Activity Name:** Name Game (Ice Breaker)
2. **Objective:** To help participants get to know each other in a fun and interactive way.
3. **Type of Activity:** Group
4. **Resources:** Pen/pencil, notebook
5. **Time Duration:** 15-20 minutes
6. **Instructions**
    - All participants sit in a circle or around a table.

- Start by saying your name with an adjective that starts with the same letter (e.g., "I'm Joyful Jahnvi").
- The person to your right repeats your name and adjective and then introduces themselves in the same format.
- Repeat this process around the circle, with each person adding their name and adjective while remembering those before them.
- Encourage participants to remember names and adjectives as they go, assisting anyone who forgets until the circle completes the round.

7. **Outcome:** Participants will learn each other's names and have a fun and engaging way to remember them. This icebreaker activity encourages creativity and interaction among participants, making it easier for them to get to know one another in a friendly and relaxed atmosphere.

Do

- Start the session with an overview of the Telecom Sector in India, covering its history, growth, and significance in the economy.
- Discuss the sub-sectors of the Telecom Industry, including telecommunications infrastructure, equipment manufacturing, and service providers.
- Explore the basics of telecom technology, such as wireless communication, network infrastructure, and digital services.
- Highlight the role and responsibilities of Telecom Grameen Udhyami in providing telecom services and promoting entrepreneurship in rural areas.
- Present various activities performed under a Telecom Grameen Udhyam, such as setting up telecommunication infrastructure, providing internet connectivity, and offering value-added services.
- Discuss organizational policies and best practices for Telecom Grameen Udhyami to ensure efficient operations and sustainable growth.
- Explore the role of Telecom Grameen Udhyami in encouraging an entrepreneurial mindset in villages, fostering innovation, and creating employment opportunities.

Ask

- How has the availability of mobile phones changed communication in your village or community?
- Can you imagine any examples of telecom services facilitating entrepreneurship in rural areas?
- Have you ever encountered challenges in accessing telecom services in remote areas?

Elaborate

- The significance of the Telecom Sector in India.
- The different sub-sectors within the Telecom Industry.
- The fundamental principles of telecom technology.
- The responsibilities of Telecom Grameen Udhyami.
- The various activities undertaken by Telecom Grameen Udhyami.
- Organizational policies and best practices.
- The impact of Telecom Grameen Udhyami on rural entrepreneurship.

Demonstrate

Demonstrate the setup of a basic telecom infrastructure, showcasing the installation of antennas, routers, and other necessary equipment.

Activity

1. **Activity Name:** Role-Play: Entrepreneurship in Action
2. **Objective:** To understand the role of Telecom Grameen Udhyami in fostering entrepreneurship in rural areas.
3. **Type of Activity:** Group
4. **Resources:** Case studies or success stories of Telecom Grameen Udhyami, flip chart, markers
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into groups, ensuring each group has equal members.
   - Assign each group a scenario where they are tasked with acting as Telecom Grameen Udhyami.
   - Provide clear instructions regarding the scenario, outlining the specific challenges and opportunities they need to consider.
   - Encourage groups to brainstorm strategies collaboratively, focusing on providing telecom services and supporting local entrepreneurs within the given scenario.
   - Allocate sufficient time for group discussions and idea generation, ensuring all members have the opportunity to contribute.
   - Remind groups to consider infrastructure, technology, funding, and community engagement in their brainstorming process.
   - After the allotted time, invite each group to present their ideas to the rest of the participants.
   - Facilitate a feedback session where participants can offer constructive comments and suggestions on each group's presentation.
   - Encourage a positive and supportive atmosphere during the feedback session, emphasizing the importance of learning from each other's ideas and experiences.
   - Summarize key insights and takeaways from the activity, highlighting common themes and innovative solutions proposed by the groups.
7. **Outcome:** Participants gain insights into the challenges and opportunities faced by Telecom Grameen Udhyami in promoting rural entrepreneurship.

Notes for Facilitation

- Encourage active participation and open dialogue throughout the session.
- Foster a supportive and inclusive learning environment.
- Emphasize the importance of innovation and adaptability in the Telecom Sector.
- Highlight the need for sustainable business practices among Telecom Grameen Udhyami.
- Encourage participants to explore potential collaboration opportunities with telecom companies and government initiatives.

Unit 1.2: Optical Fiber Technology and the Role of an Optical Fiber Splicer

Unit Objectives

By the end of this unit, the participants will be able to:

1. Summarize the history of optical fiber.
2. Infer the importance of cable jackets, strength members, and moisture/water-blocking compounds.
3. Explain the various fiber geometric parameters (core, clad, and buffer).
4. Compare optical fiber performance parameters like attenuation, bending, dispersion, cut-off wavelength, and modified diameter.
5. Illustrate the working principle of an optical fiber communication system.
6. Identify the roles and responsibilities of an Optical Fiber Splicer.
7. Prepare for the role of an Optical fiber splicer by visiting a work site and interacting with others.
8. Per the route plan, perform coordinating activities for installing and commissioning Optical Fibre Cable (OFC).
9. Identify the challenges faced during the handling of fiber optics.

Resources to be Used

Presentation slides on Optical Fiber Technology and Optical Fiber Splicing Visual aids such as diagrams and illustrations of optical fibers and splicing equipment Sample optical fiber cables for demonstration purposes Optical fiber splicing equipment (fusion splicer, cleaver, stripping tools) Safety equipment (safety glasses, gloves) Handouts or reference materials on optical fiber technology and splicing techniques.

Say

- Welcome everyone! Today, we're diving into the fascinating world of Optical Fiber Technology and the critical role of Optical Fiber Splicers.
- Our objective today is to understand the fundamentals of optical fiber technology, learn about the process of optical fiber splicing, and explore the challenges and responsibilities of an optical fiber splicer.
- Understanding optical fiber technology and splicing techniques is essential in today's digital age. It forms the backbone of modern communication networks and plays a crucial role in ensuring seamless connectivity worldwide.

Do

- Start the session with an interactive discussion to gauge participants' prior knowledge and experiences with optical fiber technology.
- Present the key concepts of optical fiber technology, including its structure, working principle, types, and performance parameters.

- Demonstrate optical fiber splicing techniques using appropriate tools and equipment.
- Facilitate hands-on practice sessions for participants to gain practical experience in optical fiber splicing.
- Encourage questions and discussions throughout the session to enhance understanding.

Ask

- How often do you use the internet or make phone calls on your mobile device?
- Can you think of any instances where you've encountered issues with internet connectivity or phone signal?
- Have you ever wondered how information travels from one place to another through cables or wires?

Elaborate

- The Structure of Optical Fibers
- How Fiber Optics Works
- Types of Optical Fibers
- Optical Fiber Performance Parameters
- The Working Principle of an Optical Fiber Communication System
- Investigate Optical Fiber Splicing
- The Role of Optical Fiber Splicer
- Coordinate Installation and Handle Challenges

Demonstrate

One basic demonstrable work related to optical fiber splicing, such as fusion splicing or mechanical splicing.

Activity

1. **Activity Name:** Fiber Splicing Practice
2. **Objective:** To develop practical skills in optical fiber splicing.
3. **Type of activity:** Group
4. **Resources:** Optical fiber splicing equipment, fiber optic cables
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Provide each group with optical fiber splicing equipment and cables.
   - Demonstrate the splicing process and safety precautions.
   - Allow groups to practice splicing under supervision.
   - Encourage teamwork and collaboration.
7. **Outcome:** Participants gain hands-on experience and confidence in optical fiber splicing techniques.

Notes for Facilitation

- Maintain a welcoming and inclusive atmosphere throughout the session.
- Encourage active participation and engagement from all participants.
- Remind participants to adhere to safety guidelines when handling optical fiber splicing equipment.
- Highlight the importance of precision and attention to detail in optical fiber splicing.
- Emphasize the role of effective communication and coordination in overcoming installation challenges.

Unit 1.3: Wi-Fi Broadband Installation and Cable Maintenance

Unit Objectives

By the end of this unit, the participants will be able to:

1. Identify various electrical and electronic components and their specifications.
2. Discuss the scope/future and industry of Wi-Fi broadband.
3. Explain the processes and technologies used in the installation of Wi-Fi broadband.
4. Demonstrate how to install cables inside homes and businesses or service outdoor lines at a communications company.
5. Demonstrate how to utilize all varieties of cable construction equipment, cables, and safety test equipment.
6. Conduct preventive maintenance activities and ensure effective fault management in case of fault occurrence.
7. State the safety, health, and environmental policies and regulations for the workplace and telecom sites in general.

Resources to be Used

Presentation slides or visual aids depicting Wi-Fi broadband installation and cable maintenance, examples of electrical and electronic components used for wireless installations, data and statistics on the Wi-Fi broadband industry in India, diagrams or models illustrating Wi-Fi broadband technology, samples of cables used in homes and businesses, along with cable construction equipment, safety test equipment for cable maintenance, materials on preventive maintenance and effective fault management in telecom cables, information on safety, health, and environmental regulations for the workplace.

Say

- Welcome, everyone! Today, we're diving into the exciting world of Wi-Fi broadband installation and cable maintenance.
- Our goal today is to understand the intricacies of Wi-Fi broadband technology and learn how to effectively install and maintain cables for optimal performance.
- By understanding Wi-Fi broadband installation and cable maintenance, you'll be equipped to handle the demands of the industry and contribute to the seamless connectivity of homes and businesses.

Do

- Introduce the session objectives and agenda.
- Engage participants with interactive discussions and activities.
- Use real-life examples and case studies to illustrate key concepts.
- Encourage participation and questions throughout the session.

- Demonstrate cable installation and maintenance techniques where applicable.
- Summarize key takeaways at the end of the session.

Ask

- What challenges have you faced with Wi-Fi connections at home or work?
- Can you think of any examples where effective cable maintenance could have prevented connectivity issues?
- How do you think Wi-Fi broadband technology has impacted communication and connectivity in India?

Elaborate

- Electrical and electronic components used for wireless installations.
- Wi-Fi broadband technology and its applications.
- The process of installing cables in homes and businesses or servicing outdoor lines.
- The preventive maintenance strategies and effective fault management in telecom cables.
- Safety, health, and environmental regulations for the workplace.

Demonstrate

Demonstrate the proper technique for installing and connecting a Wi-Fi router to a cable modem.

Activity

1. **Activity Name:** Wi-Fi Broadband Connection Challenge
2. **Objective:** To simulate real-life scenarios of troubleshooting Wi-Fi connections and implementing cable maintenance.
3. **Type of Activity:** Group
4. **Resources:** Wi-Fi routers, cables, laptops or smartphones.
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Provide each group with a Wi-Fi router, cables, and a laptop or smartphone.
   - Assign each group a scenario where they encounter Wi-Fi connectivity issues.
   - Teams must troubleshoot the issue, identify the root cause, and implement a solution using proper cable maintenance techniques.
   - Encourage teams to present their solutions to the group.
7. **Outcome:** Participants will gain hands-on experience in troubleshooting Wi-Fi connectivity issues and applying cable maintenance techniques.

Notes for Facilitation

- Maintain an interactive and engaging atmosphere throughout the session.
- Encourage collaboration and teamwork during group activities.
- Emphasize the importance of safety protocols when working with electrical components and cables.
- Highlight the relevance of the topics covered to the participants' roles and responsibilities.
- Provide additional resources or follow-up materials for further learning.

Unit 1.4: Handset/Tablet Repair

Unit Objectives

By the end of this unit, the participants will be able to:

1. List the roles and responsibilities of handset and tablet technician.
2. Explain complex technical issues to customers in a non-technical, simple-to-understand manner.
3. Determine components required based on fault diagnosis.
4. Provide repair and replacement estimates to customers.
5. Perform testing on handsets for adequacy.
6. Perform handset repair, including hardware and software components.
7. Manage post-repair activities and maintain inventory levels of hardware components.

Resources to be Used

Handsets and tablets for demonstration, visual aids such as slides or diagrams illustrating handset/tablet components, faulty handsets/tablets for diagnosis practice repair tools including screwdrivers, prying tools, and soldering equipment, worksheets or handouts detailing common technical issues and their solutions, price lists for repair and replacement estimates, post-repair checklist templates

Say

- Welcome everyone! I'm excited to dive into the handset and tablet repair world with you all today.
- Our objective is to understand the role and responsibilities of handset and tablet technicians, learn how to explain complex technical issues to customers and grasp the basics of handset repair in terms of hardware and software.
- Understanding handset and tablet repair is not just about fixing devices; it's about empowering ourselves with valuable skills in high demand in today's tech-driven world.

Do

- Begin by introducing the topic and discussing the role and responsibilities of handset and tablet technicians.
- Use visual aids and real-life examples to explain how to communicate complex technical issues to customers simply.
- Demonstrate the process of determining components required based on fault diagnosis.
- Provide examples and scenarios for practising repair and replacement estimates.
- Conduct hands-on activities to practice handset repair techniques, both hardware and software.
- Guide participants through performing testing on handsets for adequacy.
- Discuss post-repair activities and the importance of thorough testing and quality assurance.

Ask

- What was the last technical issue you encountered with your handset or tablet?
- Have you ever had to explain a technical problem to someone who is not tech-savvy? How did you approach it?
- Can you think of a time when you had to estimate the cost of repairing or replacing a device? What factors did you consider?

Elaborate

- Components are required based on fault diagnosis.
- Complex technical issues to customers in a simple manner.
- Testing on handsets for adequacy.
- Repair and replacement estimates to customers.
- Basics of handset repair, including hardware and software.
- Post-repair activities.

Demonstrate

Demonstrate how to identify common components on a faulty handset or tablet, such as the battery, screen, motherboard, and camera.

Activity

1. **Activity Name:** Troubleshooting Practice
2. **Objective:** To practice diagnosing and solving common technical issues on handsets and tablets.
3. **Type of Activity:** Group
4. **Resources:** Faulty handsets/tablets, worksheets with troubleshooting scenarios
5. **Time Duration:** 20-35 minutes
6. **Instructions**
    - Divide participants into small groups.
    - Provide each group with a faulty handset/tablet and a troubleshooting scenario.
    - Instruct them to work together to diagnose the issue and devise a solution.
    - Encourage discussion and collaboration among group members.
    - Remind participants to communicate effectively and share their ideas openly.
    - Offer assistance and guidance as needed.
    - Allocate sufficient time for groups to complete the task.
    - Facilitate a debrief session afterwards to discuss the solutions and any challenges encountered.
    - Encourage reflection on the problem-solving process and identify lessons learned.
    - Wrap up the activity by summarizing key takeaways and insights.
7. **Outcome:** Improved problem-solving skills and familiarity with common technical issues.

Notes for Facilitation

- Arrive early to set up demonstration materials and ensure all equipment is in working order.
- Foster a supportive learning environment where participants feel comfortable asking questions and making mistakes.
- Encourage hands-on practice and provide constructive feedback during activities.
- Remind participants to focus on communication skills when explaining technical issues to customers.
- Emphasize the importance of thorough testing and quality assurance in the repair process.
- Wrap up the session with a recap of key concepts and encourage participants to continue practising their skills outside class.

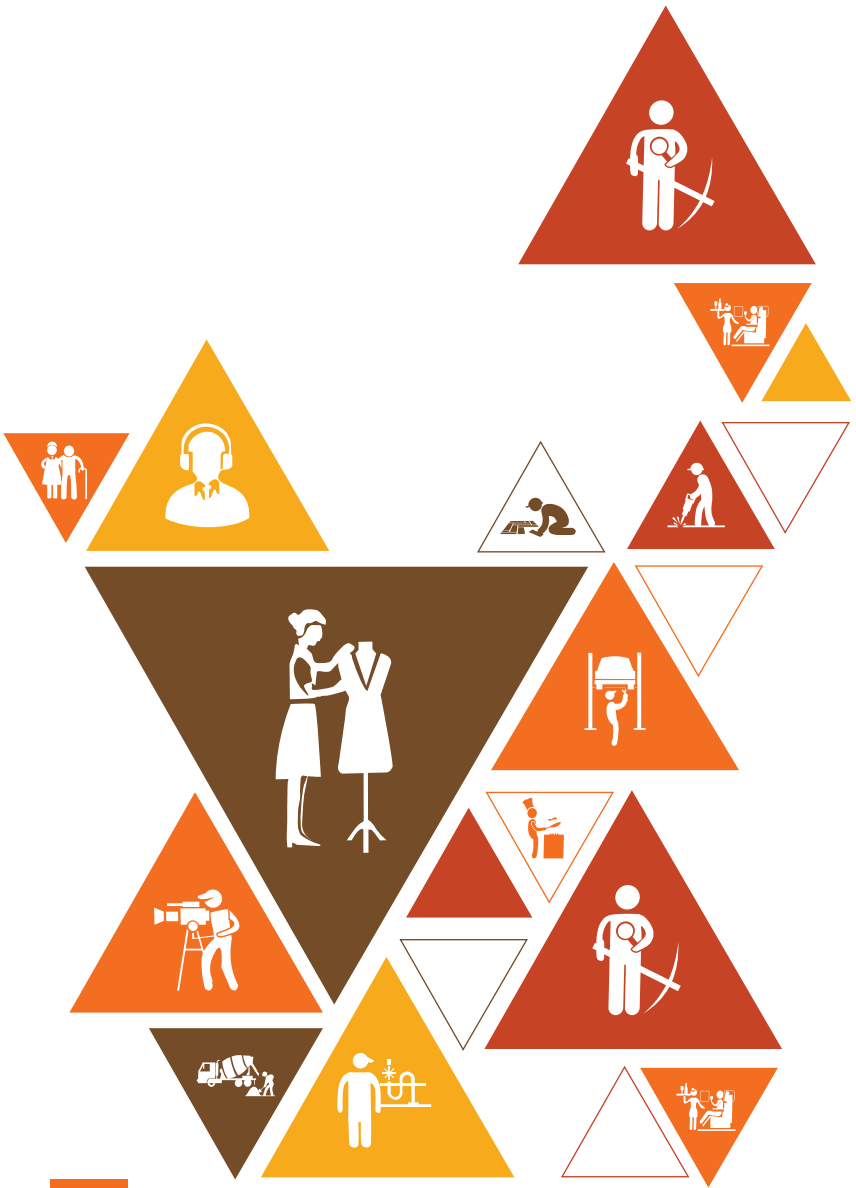
Answers to Exercises for PHB

Multiple Choice Questions:

1. b. Communication using technology over distances
2. b. Promoting connectivity in rural areas
3. b. Daily maintenance of telecom networks
4. d. Chief Executive Officer (CEO) of a telecom firm
5. b. By creating employment opportunities in rural areas

Descriptive Questions:

1. Refer UNIT 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami Topic 1.1.1 Telecom Sector in India
2. Refer UNIT 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami Topic 1.1.4 Role and Responsibilities of Telecom Grameen Udhyami
3. Refer UNIT 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami Topic 1.1.5 Various Activities Performed under a Telecom Grameen Udhyami
4. Refer UNIT 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami 1.1.6 Organizational Policies and Best Practices for Telecom Grameen Udhyami
5. Refer UNIT 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami 1.1.7 Role of Telecom Grameen Udhyami in Encouraging Entrepreneurial Mindset in the Village



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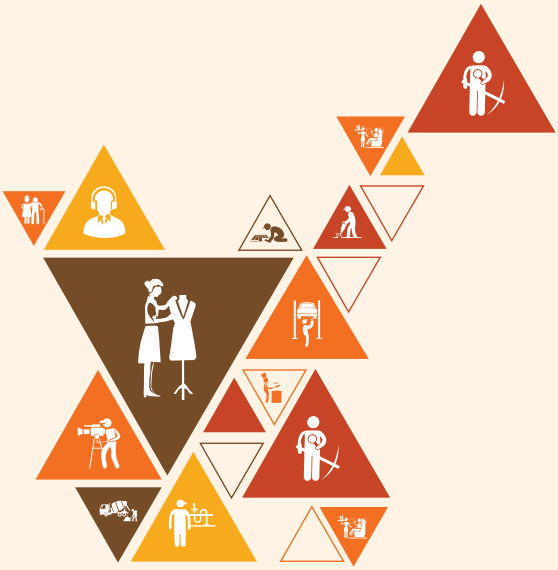
2. Handle Hand and Power Tools Relevant to Construction Electrical Works

Unit 2.1 - Electrical Fundamentals and Circuits

Unit 2.2 - Electrical Installation and Maintenance Operations



CON/N0602

Key Learning Outcomes 

By the end of this module, the participants will be able to:

1. Explain the basic principle of electrical current flow and the fundamental concept of alternate and direct current, voltage, resistance, temperature, cross-section of conductors, etc.
2. Explain the application of a tester, mustimeter, digital ammeter etc.
3. Interpret wiring symbols, SLDs, manufacturer's guidelines and electrical specifications.
4. Discuss the use of various electrical hand and power tools, such as pliers, crimping tools, electrical drill machines, cutting machines, etc., during the electrical wiring of a house/ building.
5. Demonstrate how to check hand and power tools' proper and safe working.
6. Using hand and power tools, perform fitting of conduits, cables wiring, fixing of electrical fixtures, electrical connection termination at power outlets, etc.
7. Per manufacturer's guidelines, perform maintenance of electrical tools and devices post-use.

Unit 2.1: Electrical Fundamentals and Circuits

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain the basic principle of electrical current flow and the fundamental concept of alternate and direct current, voltage, resistance, temperature, cross-section of conductors, etc.
2. Explain Ampere's law, Ohm's law, and electromagnetic field.
3. Explain the application of tester, mustimeter, digital ammeter, etc.
4. Interpret wiring symbols, SLDs, manufacturer's guidelines and electrical specifications
5. Discuss the use of various electrical hand and power tools, such as pliers, crimping tools, electrical drill machines, cutting machines, etc., during the electrical wiring of a house/ building.
6. Explain the type of electrical devices like starters, relays and circuit breakers, their power ratings, working principles and use in circuits.
7. Describe features of switches, fuses, resistors and various circuit-protecting devices and their use in electrical circuits and connections.

Resources to be Used

Presentation slides or whiteboard and markers Electrical testers (multimeter, digital ammeter) Various electrical hand and power tools (e.g., screwdriver, pliers, wire stripper) Electrical devices (e.g., light bulbs, switches) Circuit components (switches, fuses, resistors)

Say

- Welcome, everyone! Today, we're diving into the fascinating world of Electrical Fundamentals and Circuits.
- By the end of this session, you'll have a solid understanding of the basic principles of electrical current flow, fundamental concepts, and practical applications in everyday life.
- Understanding electrical fundamentals and circuits is crucial for professionals in the field and everyone who interacts with electricity daily. It empowers you to make informed decisions and handle electrical devices safely.

Do

- Start by introducing the basic principles of electrical current flow and fundamental concepts.
- Explain Ampere's law, Ohm's law, and the concept of electromagnetic fields.
- Demonstrate the application of testers such as multimeters and digital ammeters.
- Discuss various electrical hand and power tools and their uses.
- Explore different types of electrical devices and their functions.

- Examine the features of switches, fuses, resistors, and various circuit components.
- Encourage questions and discussions throughout the session to enhance understanding.

Ask

- How often do you use electrical devices in your daily life?
- Can you think of any instances where understanding electrical principles could be beneficial?
- Have you ever encountered an electrical problem and wished you knew more about circuits?

Elaborate

- Electrical current flow and its significance.
- Ampere's law and its role in electromagnetism.
- Ohm's law and its application in determining electrical behaviour.
- The concept of electromagnetic fields and their effects.
- The functions and uses of testers are multimeters and digital ammeters.
- The importance of using appropriate electrical hand and power tools.
- The features and functions of switches, fuses, resistors, and various circuit components.

Demonstrate

Demonstrate using a multimeter to measure voltage and current in a simple circuit.

Activity

1. **Activity name:** Circuit Building Challenge
2. **Objective:** To reinforce understanding of circuit components and their functions.
3. **Type of Activity:** Group
4. **Resources:** Circuit components (battery, wires, switches, resistors, bulbs)
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Divide participants into groups of 3-4.
    - Provide each group with a set of circuit components.
    - Instruct them to build a circuit with a power source, switch, resistor, and bulb.
    - Encourage creativity in circuit design.
    - After completion, have each group explain their circuit's functionality.
7. **Outcome:** Enhanced understanding of circuit components and their interconnections.

Notes for Facilitation

- Keep the session interactive and encourage questions and discussions.
- Ensure safety protocols are followed when handling electrical tools and devices.
- Emphasize the practical applications of the topics covered.
- Provide real-life examples to illustrate abstract concepts.
- Use visuals and demonstrations to enhance understanding.
- Encourage teamwork and collaboration during activities.

Unit 2.2: Electrical Installation and Maintenance Operations

Unit Objectives

By the end of this unit, the participants will be able to:

1. Discuss the electrical measuring/ testing tools and devices such as voltage, earth, mustimeter, digital ammeter, meggers, tong tester, etc.
2. Demonstrate how to check hand and power tools' proper and safe working.
3. Perform fitting of conduits, cables wiring, fixing of electrical fixtures, electrical connection termination at power outlets, etc., using hand and power tools.
4. Measure size and dimension of wires, conduits as per electrical installation/ maintenance work requirement using measuring instruments
5. Perform basic inspections of electrical circuits/ wiring using electrical devices like ammeters, voltmeters, meggers, multimeters, tong testers, earth testers, etc.
6. Install electrical components like starter, circuit breakers, relays, etc.
7. Perform maintenance of electrical tools, and devices post use as per manufacturer's guidelines.

Resources to be Used

Hand and power tools (e.g., screwdrivers, pliers, drills) Electrical measuring/testing tools and devices (e.g., ammeter, voltmeter, multi-meter) Conduits, cables, wiring materials Electrical fixtures and components (e.g., starters, circuit breakers, relays) Safety gear (e.g., gloves, goggles, helmets) Instruction manuals for electrical tools and devices

Say

- Welcome, everyone! Today, we're diving into the essential aspects of Electrical Installation and Maintenance Operations.
- Our goal today is to equip you with the knowledge and skills to safely and effectively handle electrical tasks using appropriate tools and techniques.
- Understanding electrical installation and maintenance is crucial for ensuring safety, efficiency, and reliability in various settings, from homes to industrial facilities.

Do

- Start the session with a brief overview of electrical safety practices.
- Introduce each tool and device, explaining its purpose and how to use it safely.
- Demonstrate proper techniques for fitting conduits, cables, wiring, and electrical fixtures.
- Conduct hands-on practice sessions with the tools and materials provided.
- Review maintenance procedures for electrical tools and devices according to manufacturer guidelines.
- Encourage participants to ask questions and seek clarification throughout the session.

Ask

- What electrical tools or devices do you use in your daily life?
- Can you share a real-life example where proper electrical maintenance could prevent accidents or damage?
- How do you ensure your safety when working with electricity at home or at work?

Elaborate

- Appropriate wires, conduits, and dimensions for specific electrical installation tasks.
- Electrical measuring devices to inspect circuits, test voltage, and check continuity.
- The function and importance of electrical components like starters, circuit breakers, and relays.
- Safe and proper termination of electrical connections at power outlets.

Demonstrate

Proper use of a multi-meter to measure the voltage across a circuit.

Activity

1. **Activity name:** Electrical Safety Inspection
2. **Objective:** To apply knowledge of electrical safety practices and inspection techniques.
3. **Type of Activity:** Group
4. **Resources:** Safety gear, electrical measuring devices
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into groups of 3-4.
    - Assign each group specific areas to inspect for electrical safety hazards.
    - Provide each group with electrical measuring devices.
    - Instruct the groups to use these devices to identify potential issues.
    - Encourage them to suggest corrective actions based on their findings.
7. **Outcome:** Increased awareness of electrical safety hazards and practical experience in conducting safety inspections.

Notes for Facilitation

- Ensure participants wear appropriate safety gear throughout the session.
- Encourage active participation and hands-on practice to reinforce learning.
- Emphasize the importance of following manufacturer guidelines for tool maintenance.
- Remind participants to always de-energize circuits before performing any electrical work.
- Provide additional support and guidance to participants who may be less familiar with electrical concepts and techniques.

Answers to Exercises for PHB

Multiple Choice Questions:

1. a. Movement of electrons through a conductor
2. c. Current = Voltage x Resistance
3. a. Multimeter
4. a. The relationship between current and magnetic fields
5. d. Fuse

Descriptive Questions:

1. Refer UNIT 2.2: Electrical Installation and Maintenance Operations
   Topic 2.2.1 Electrical measuring/ testing tools and devices
2. Refer UNIT 2.1: Electrical Fundamentals and Circuits
   Topic 2.1.2 Ampere's law, Ohm's law, and electromagnetic field
3. Refer UNIT 2.1: Electrical Fundamentals and Circuits
   Topic 2.1.3 Application of tester, mustimeter, digital ammeter
4. Refer UNIT 2.1: Electrical Fundamentals and Circuits
   Topic 2.1.4 Wiring symbols, SLDs, manufacturer's guidelines and electrical specifications
5. Refer UNIT 2.1: Electrical Fundamentals and Circuits
   Topic 2.2.3 Fitting of conduits, cables wiring, fixing of electrical fixtures, electrical connection termination at power outlets, etc. using hand and power tools

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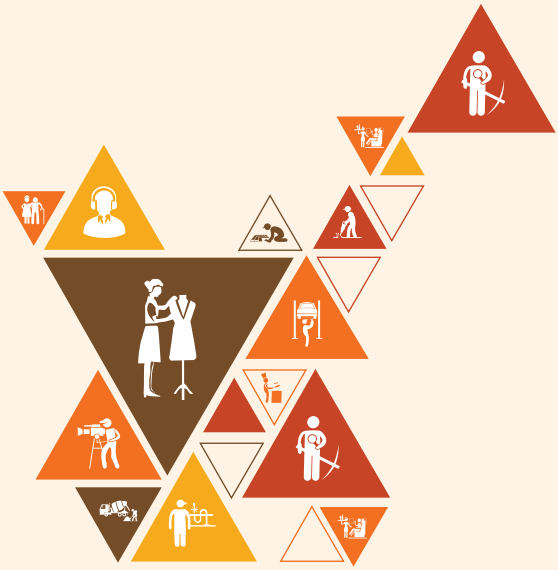
3. Pre-requisites of Wiring and Wi-Fi Backhaul Equipment

Unit 3.1 - Installation of Wi-Fi System

Unit 3.2 - Complete Documentation



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Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Define work-orders and job sheets, their significance and parameters.
2. Discuss overall organisational policies, standards, values and processes.
3. Discuss the necessary documentation required for installation and different payment modes.
4. State the safety norms to be followed and emergency contacts.
5. Explain the escalation matrix for reporting identified incidents, trouble sand/emergencies, e.g., system failures, fire and power failures.
6. Match connectors to the correct type of cable for installation.
7. Demonstrate the installation and usage of cable termination between equipment and antenna.
8. Test the cable and joints for transmission loss and strength.
9. Demonstrate how to write and record appropriate technical forms activity logs.

Unit 3.1: Installation of Wi-Fi System

Unit Objectives

By the end of this unit, the participants will be able to:

1. Analyse work-orders and job sheets, their significance and parameters
2. List the different types of cables, connectors, tools and equipment required for installation
3. Distinguish between different processes for cable laying and feeder cable laying
4. Explain different electrical principles and safety measures to be considered while turning on the Wi-Fi system
5. Walk through the steps of Wi-Fi system installation
6. Demonstrate the installation and usage of cable termination between equipment and antenna
7. Test the cable and joints for transmission loss and strength

Resources to be Used

Projector or whiteboard for visual aids, a Wi-Fi system installation kit including cables, connectors, and tools, work orders and job sheets samples, diagrams of Wi-Fi backhaul and feeder cable laying, various types of cables and connectors for demonstration, and safety equipment such as gloves and goggles.

Say

- Welcome, everyone! Let's dive into the world of Wi-Fi system installation today.
- Today, we'll be focusing on the essential steps and principles involved in installing a Wi-Fi system, ensuring you're equipped with the knowledge to handle installation tasks confidently.
- Understanding Wi-Fi installation is crucial in today's digital age. Whether you're a technician or simply interested in technology, grasping these concepts empowers you to contribute to the seamless functioning of our interconnected world.

Do

- Begin by introducing the session objectives and agenda.
- Present each topic sequentially, using visual aids and real-world examples where possible.
- Encourage participation and questions throughout the session to ensure understanding.
- Conduct hands-on demonstrations of cable termination and connector matching.
- Conclude with a summary of key points and open the floor for further inquiries.

Ask

- Can you think of any situations where you've encountered Wi-Fi installation or connectivity issues in your daily life?
- How do you imagine Wi-Fi backhaul functions to ensure consistent internet connectivity?
- Have you ever had to troubleshoot Wi-Fi connection problems at home or work?

Elaborate

- Work orders and job sheets to understand installation requirements.
- Wi-Fi backhaul components and their role in network stability.
- Feeder cables systematically to optimize signal strength.
- Wi-Fi systems according to industry standards and guidelines.
- Connectors to the correct cable types for seamless installation.
- The electrical principles when activating Wi-Fi systems.

Demonstrate

Demonstrate the proper technique for terminating cables between equipment and antennas, emphasizing the importance of precision and safety.

Activity

1. **Activity name:** Cable Termination Practice
2. **Objective:** To practice cable termination skills and reinforce understanding of connector types.
3. **Type of Activity:** Individual
4. **Resources:** Wi-Fi installation kit, various cables, connectors, and termination tools
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into groups of 3-4.
    - Provide participants with the necessary equipment for cable termination, including cables, connectors, and termination tools.
    - Conduct a demonstration showcasing the correct techniques for terminating cables, focusing on precision and safety measures.
    - Instruct participants to follow the demonstrated techniques while practising cable termination themselves.
    - Emphasize the importance of adhering to safety precautions throughout the activity.
    - Encourage participants to ask questions and seek clarification as needed during the practice session.
    - Monitor participants' progress and provide guidance or assistance to ensure they effectively grasp the correct techniques.
7. **Outcome:** Improved proficiency in cable termination and familiarity with connector types.

Notes for Facilitation

- Ensure a conducive learning environment by encouraging active participation and addressing questions promptly.
- Provide ample time for hands-on practice and demonstrations to reinforce theoretical concepts.
- Emphasize safety protocols when handling equipment and working with electrical components.
- Highlight the importance of accuracy and attention to detail in Wi-Fi system installation to minimize errors and ensure optimal performance.
- Offer additional resources or support for participants who wish to deepen their understanding of specific topics covered.

Unit 3.2: Complete Documentation

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain the importance of providing satisfactory customer service and taking customer feedback
2. Discuss necessary documentation required for installation and different payment modes
3. Demonstrate how to write and record appropriate technical forms, activity logs
4. State the safety norms to be followed and emergency contacts
5. Explain the escalation matrix for reporting identified incidents, trouble sand/emergencies, e.g., system failures, fire and power failures

Resources to be Used

Presentation slides on complete documentation, examples of satisfactory customer service scenarios, installation documentation templates, samples of different payment modes (cash, credit card, and online payment), technical forms and activity logs templates, workplace safety guidelines, and incident escalation matrix

Say

- Hello everyone, welcome to today's session on Complete Documentation and the Importance of Satisfactory Customer Service!
- Today, we'll explore the significance of thorough documentation, understand the importance of providing satisfactory customer service, and discuss various aspects such as installation documentation, payment modes, technical forms, activity logs, safety norms, and incident reporting.
- Understanding these topics is essential for ensuring smooth operations, delivering exceptional service to our customers, and maintaining a safe work environment. Let's equip ourselves with the knowledge and skills needed to excel in our roles.

Do

- Review the agenda and objectives with participants.
- Engage participants in discussions and activities related to each topic.
- Encourage participation and questions throughout the session.

Ask

- Can anyone share a recent experience where thorough documentation helped resolve an issue effectively?
- How do you think providing satisfactory customer service contributes to the success of our organization?
- Have you ever encountered a workplace safety issue? How was it addressed?

Elaborate

- Documentation Requirements for Installation
- Different Payment Modes and their Implementation
- The Importance of Satisfactory Customer Service
- The General Safety Norms to be followed at Workplace
- The Escalation Matrix for Reporting Incidents

Demonstrate

Demonstrate how to fill out a technical form or activity log accurately.

Activity

1. **Activity name:** Documentation Checklist Exercise
2. **Objective:** Reinforce understanding of documentation requirements.
3. **Type of Activity:** Group
4. **Resources:** Sample documentation templates, pens, and paper
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into groups.
   - Provide each group with a documentation checklist exercise.
   - Instruct groups to identify and list essential documentation required for a hypothetical installation scenario.
   - Encourage discussion within each group to brainstorm and prioritize the documentation items.
   - After completion of the exercise, have each group present their findings to the rest of the participants.
   - Facilitate a discussion on the different perspectives and insights shared by each group.
7. **Outcome:** Improved understanding of documentation requirements and teamwork skills.

Notes for Facilitation

- Provide opportunities for interactive discussions and encourage participation from all participants.
- Ensure clarity in explaining technical terms and concepts related to documentation and customer service.
- Emphasize the importance of accuracy and attention to detail in documentation and customer interactions.
- Highlight the significance of adhering to safety norms and reporting incidents promptly.
- Encourage a positive learning environment and support participants in applying the knowledge gained to their roles effectively.

Answers to Exercises for PHB

Multiple Choice Questions:

1. a. work-sheet
2. a. Wi-Fi backhaul
3. c. Feeder
4. a. Site Survey Report
5. b. escalation matrix

Descriptive Questions:

1. Refer UNIT 3.1: Installation of Wi-Fi System
   Topic 3.1.3 Cables, Connectors, Tools and Equipment Required for Installation
2. Refer UNIT 3.2: Complete Documentation
   Topic 3.2.5 General Safety Norms to be Followed at Workplace
3. Refer UNIT 3.2: Complete Documentation
   Topic 3.2.1 Importance of Satisfactory Customer Service
4. Refer UNIT 3.2: Complete Documentation
   Topic 3.2.6 Escalation Matrix for Reporting Incidents
5. Refer UNIT 3.1: Installation of Wi-Fi System
   Topic 3.1.9 Electrical Principles to be Considered while Turning on the Wi-Fi System

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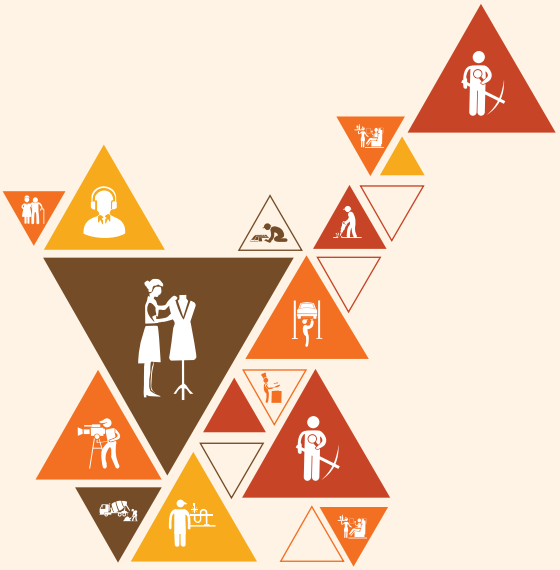
4. Prepare for Splicing Operations for New Installation

Unit 4.1 - Manage Tools and Spares

Unit 4.2 - Pre-Installation Procedures

Unit 4.3 - Installation of Optical Fibre

Unit 4.4 - Preparing the Cable for Splicing



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Key Learning Outcomes 

By the end of this module, the participants will be able to:

1. Discuss the characteristics of Optical Fibre
2. Identify the tools and equipment required for optical fibre splicing
3. Conduct fault analysis procedures and implement safety measures for different tools and mechanical equipment
4. Discuss the importance of calibrating the test equipment
5. Explain the colour coding of optical fibre cable
6. Demonstrate the steps to prepare the cable for splicing for the new installation
7. Perform tests on OFC using an optical inspection microscope, OTDR and visual fault locator
8. Illustrate bare fibre testing

Unit 4.1: Manage Tools and Spares

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain the characteristics of optical fibre (refraction, polarisation, attenuation, dispersion, etc.)
2. Identify various fibre optics tools

Resources to be Used

Presentation slides on optical fibre characteristics and optical equipment, Samples of optical fibres and optical equipment (if available), Whiteboard and markers, Handouts or worksheets for participants, projector and screen

Say

- Welcome everyone! Today, we're diving into the fascinating optical fibre and equipment world.
- Our objective today is to understand the characteristics of optical fibre and various optical equipment. By the end of this session, you'll grasp how these components function and their importance in telecommunications.
- Understanding optical fibre and equipment is crucial in today's digital age. They form the backbone of modern communication networks, and having a solid grasp of their characteristics empowers us to troubleshoot, maintain, and innovate in the field.

Do

- Begin the session by introducing the topic and providing an overview of what will be covered.
- Use a combination of presentation slides, hands-on demonstrations (if possible), and interactive discussions to engage participants.
- Encourage questions and participation throughout the session.
- Summarize key points and encourage participants to take notes or ask for clarification as needed.
- Conclude the session by reinforcing the main concepts and highlighting their relevance in the field.

Ask

- What are some examples of optical equipment you encounter in your daily life?
- How do you think optical fibre technology has revolutionized communication?
- Can you think of any real-life scenarios where understanding optical fibre characteristics would be important?

Elaborate

- Optical fibre characteristics (e.g., low attenuation, high bandwidth, immunity to electromagnetic interference).
- The function and importance of various optical equipment (e.g., optical transmitters, receivers, amplifiers).
- The role of optical fibre in telecommunications networks and its advantages over traditional copper cables.

Demonstrate

Demonstrate how light propagates through an optical fibre using a simple laser pointer and a piece of optical fibre. Show how bending or twisting affects light transmission.

Activity

1. **Activity name:** Optical Equipment Identification
2. **Objective:** To familiarize participants with various types of optical equipment and their functions.
3. **Type of Activity:** Group
4. **Resources:** Samples of optical equipment, handouts with equipment descriptions
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Divide participants into groups.
    - Provide each group with samples of optical equipment and handouts detailing equipment descriptions.
    - Instruct groups to match each piece of equipment with its corresponding description within the given time frame.
    - Encourage discussion and collaboration within groups.
    - After completion, review the correct answers with the entire group.
7. **Outcome:** Participants will gain practical experience identifying various optical equipment and understanding their functions.

Notes for Facilitation

- Maintain a balance between theory and practical demonstrations to keep participants engaged.
- Encourage active participation and questions throughout the session.
- Remind participants to take notes and ask for clarification whenever needed.
- Emphasize the importance of understanding optical fibre characteristics and equipment in the context of modern telecommunications networks.
- Highlight potential career opportunities in the field of optical fibre technology and encourage further exploration of related topics.

Unit 4.2: Pre-Installation Procedures

Unit Objectives

By the end of this unit, the participants will be able to:

1. Describe fibre optic cable specification – tensile strength, bend radius, crush and impact, cable attenuation, fibre optic connectivity
2. Explain and outline factors affecting fibre optic cable – natural and man-made
3. Demonstrate the correct procedure of – unloading, unwrapping, storage, drum preparation and opening of optical fibre cable
4. Demonstrate and execute optical fibre laying pre-requisites

Resources to be Used

Whiteboard or flip chart with markers, samples of fiber optic cables, a drum or spool of optical fiber cable, colour code reference materials, and any relevant documentation or diagrams.

Say

- Hello everyone! Welcome to today's session on Pre-Installation Procedures.
- Today, we'll dive into the essential steps and considerations involved in preparing for installing fiber optic cables.
- Understanding pre-installation procedures ensures smooth and efficient deployment of fiber optic infrastructure, minimizing errors and maximizing performance.

Do

- Start by providing an overview of the topics to be covered.
- Encourage participation and questions throughout the session.
- Use real-world examples and practical demonstrations to reinforce key concepts.

Ask

- Can anyone share an example of a situation where proper pre-planning made a significant difference in the outcome?
- How often do you encounter fiber optic cables daily, and what do you know about their installation requirements?
- Have you ever faced challenges due to improper handling or installation of cables? What were they?

Elaborate

- Factors Affecting OFC
- Factors Affecting Choosing of Cables
- Handling Optical Fibre Cable
- Pre-Installation - Drum Inspection
- Colour Coding of Optical Fibre Cable

Demonstrate

Demonstrate the proper method for inspecting a drum of optical fiber cable, highlighting key areas to check for damage or defects.

Activity

1. **Activity name:** Cable Handling Simulation
2. **Objective:** To reinforce proper cable handling techniques.
3. **Type of Activity:** Group
4. **Resources:** Samples of fiber optic cables
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Divide participants into small groups.
    - Provide each group with a sample of fiber optic cable.
    - Instruct the groups to simulate various cable handling scenarios, including coiling, uncoiling, and routing through conduit.
    - Emphasize adherence to best practices for cable handling throughout the simulation.
    - Encourage discussion among group members during the activity.
    - Facilitate feedback sessions after the activity to discuss observations and lessons learned.
7. **Outcome:** Increased awareness and proficiency in cable handling techniques.

Notes for Facilitation

- Establish a supportive and inclusive learning environment.
- Encourage active participation and engagement from all participants.
- Emphasize the importance of safety protocols and best practices during cable handling and installation.
- Highlight the significance of thorough pre-installation procedures in ensuring the success of fiber optic projects.
- Address any specific concerns or questions raised by participants regarding pre-installation procedures.

Unit 4.3: Installation of Optical Fibre

Unit Objectives

By the end of this unit, the participants will be able to:

1. Demonstrate and monitor installation of optical fibre – trenching, aerial cabling, ducting, figure eight, cable pulling, blowing, and termination; perform effective tests
2. Demonstrate effective reporting and documentation skills

Resources to be Used

Presentation slides on Installation of optical fiber, samples of optical fiber cables and connectors, installation tools such as cable cutters, splicers, and fusion splicing machines, testing equipment including OTDR (optical time domain reflectometer) and optical power meters documentation templates for reporting

Say

- Welcome everyone! Today, we're diving into the exciting world of Optical Fiber Installation.
- Our goal today is to understand the process of installing optical fiber, including testing and documentation.
- By understanding optical fiber installation, you'll be equipped to contribute effectively to network deployment projects and ensure reliable connectivity.

Do

- Begin by introducing the topic and its importance in modern telecommunications.
- Demonstrate the proper handling and installation techniques for optical fiber cables and connectors.
- Conduct hands-on activities for splicing and termination, allowing participants to practice under supervision.

Ask

- How many of you have encountered optical fiber installations in your daily lives?
- Can you think of any real-life examples where optical fiber technology is used extensively?
- What challenges do you think technicians might face during the installation process?

Elaborate

- Key components of optical fiber installation.
- The steps involved in installing optical fiber cables.
- The importance of testing and quality assurance in the installation process.
- Best practices for reporting and documentation.

Demonstrate

Demonstrate how to splice optical fiber cables using a fusion splicing machine.

Activity

1. **Activity name:** Fiber Optic Cable Termination
2. **Objective:** To practice terminating optical fiber cables with connectors accurately.
3. **Type of Activity:** Individual
4. **Resources:** Optical fiber cables, connectors, termination tools
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Provide each participant with an optical fiber cable and connectors.
    - Instruct them to carefully strip, clean, and terminate the cable with connectors.
    - Supervise and provide guidance as needed.
    - Once terminated, test the connectivity using an optical power meter.
7. **Outcome:** Participants will gain hands-on experience terminating optical fiber cables, ensuring proper connectivity.

Notes for Facilitation

- Maintain an engaging and interactive atmosphere throughout the session.
- Encourage participants to ask questions and seek clarification.
- Emphasize the importance of precision and accuracy in optical fiber installation.
- Highlight safety precautions when handling fiber optic cables and equipment.
- Provide additional resources for further learning, such as online tutorials or reference materials.

Unit 4.4: Preparing the Cable for Splicing

Unit Objectives

By the end of this unit, the participants will be able to:

1. Inspect Optical Time Domain Reflectometer (OTDR), Power Meter, Splicer, Cleaver, and other mechanical tools/equipment for any fault and calibration status
2. Discuss the importance of calibrating the test equipment
3. Demonstrate the steps of preparing the cable for splicing for new installation

Resources to be Used

Optical Fiber Cable (OFC) splicing machine, fiber optic cables, cleaver fusion splicer, power meter light source, alcohol wipes fiber stripper, fiber optic cleaning solution, heat shrink sleeves, heat shrink oven, safety glasses

Say

- Hello everyone, and welcome to today's session on the installation of preparing the cable for splicing!
- Today, we'll learn about the crucial steps involved in preparing optical fiber cables for splicing, the instruments used for testing and splicing OFC, and the importance of calibrating test equipment.
- Understanding how to properly prepare cables for splicing ensures efficient and reliable connections, which are essential for the performance of optical fiber networks. You'll be equipped to handle OFC installations with confidence and precision by mastering these techniques.

Do

- Begin by introducing the topic and its importance.
- Demonstrate each step of preparing the cable for splicing using the appropriate tools.
- Guide participants through the calibration process for test equipment.
- Facilitate hands-on practice sessions for participants to apply the techniques learned.

Ask

- What are some examples of situations where having a reliable optical fiber connection is important?
- Have you ever encountered challenges with splicing optical fiber cables before? What were they?
- How do you think calibrating test equipment contributes to the accuracy of optical fiber installations?

Elaborate

- Explain fiber optic cable types and their characteristics.
- The proper use of fiber stripping and cleaving tools.
- The fusion splicing process and its significance.
- The role of power meters and light sources in testing optical fiber connections.
- The calibration process for test equipment.
- The importance of cleanliness and safety during cable preparation and splicing.

Demonstrate

Demonstrate the process of stripping and cleaving an optical fiber cable using the appropriate tools.

Activity

1. **Activity name:** Cable Preparation Challenge
2. **Objective:** To reinforce the understanding of cable preparation techniques.
3. **Type of Activity:** Group
4. **Resources:** Optical fiber cables, cleavers, fiber strippers, fusion splicers
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into groups.
    - Provide each group with optical fiber cables of varying lengths.
    - Instruct the groups to prepare the cables for splicing.
    - Ensure they follow the techniques demonstrated during the session.
    - Encourage precision and speed in completing the task.
    - Announce that the group with the highest precision and speed wins.
7. **Outcome:** Participants will gain hands-on experience in cable preparation techniques and teamwork skills.

Notes for Facilitation

- Maintain a supportive and encouraging atmosphere throughout the session.
- Encourage participants to ask questions and seek clarification whenever needed.
- Emphasize the importance of precision and attention to detail during cable preparation.
- Remind participants to follow safety protocols, such as wearing safety glasses and handling tools with care.
- Provide feedback and guidance to help participants improve their skills throughout the session.

Answers to Exercises for PHB

Multiple Choice Question

1. a. normal
2. a. unpolarised light
3. a. attenuation
4. a. protector
5. a. Drum wrappers

Descriptive Questions:

1. Refer UNIT 4.1: Manage Tools and Spares
   Topic 4.1.1 Characteristics of Optical Fibre
2. Refer UNIT 4.1: Manage Tools and Spares
   Topic 4.1.1 Characteristics of Optical Fibre
3. Refer Unit 4.3: Installation of Optical Fibre
   Topic 4.3.1 Installing OFC
4. Refer Unit 4.3: Installation of Optical Fibre
   Topic 4.3.1 Installing OFC
5. Refer Unit 4.3: Installation of Optical Fibre
   Topic 4.3.1 Installing OFC

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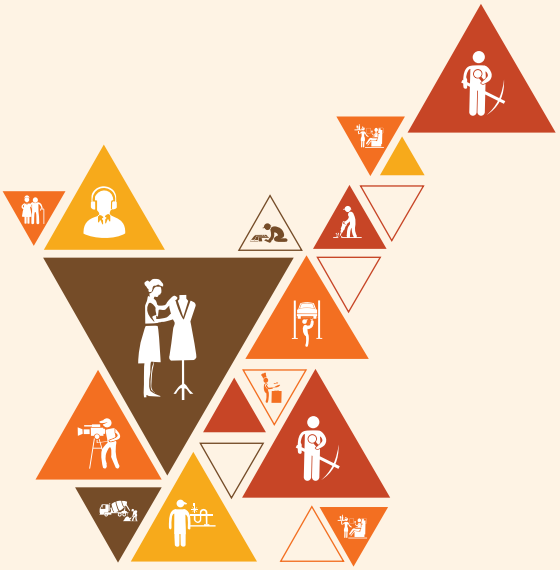
5. In-building FTTH/X Cabling

Unit 5.1 - Basics of Fiber Optics

Unit 5.2 - Installation of Optical Fibers

Unit 5.3 - Testing Installed Network



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Key Learning Outcomes

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

1. Demonstrate cable installation through cable trays (horizontal/vertical)
2. Show how to install cables through conduits
3. Show how to install cables through the false ceiling
4. Illustrate the procedure for terminations at ONT and TO

Unit 5.1: Basics of Fiber Optics

Unit Objectives

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

1. Distinguish fiber optic cable types and characteristics for in-building deployments
2. Demonstrate appropriate fiber handling practices
3. Describe the fiber cable components (strength members, cable sheath, core, cladding etc.)
4. Illustrate the VLF principal and testing features

Resources to be Used

Presentation slides on basics of fiber optics, samples of different types of fiber optic cables, bend radius demonstration tool or visual aid, samples of optical fiber cable components, visual aid or demonstration setup for VLF testing

Say

- Hello everyone! Welcome to today's session on the Basics of Fiber Optics.
- Today, we'll be exploring the fundamentals of fiber optics, including types of cables, bend radius considerations, components of optical fiber cables, and VLF testing.
- Understanding fiber optics is crucial in today's digital age as it underpins much of our communication infrastructure. Whether it's internet connectivity, telecommunications, or data transmission, fiber optics play a vital role, and grasping its basics will empower you in various technical fields.

Do

- Introduce the session objectives and agenda.
- Present the content using slides or visual aids.
- Encourage participation and questions throughout the session.

Ask

- How do you think fiber optics impact our daily lives?
- Can you think of any real-life examples where fiber optics are used for communication?
- Have you ever encountered any challenges or issues related to fiber optic cables?

Elaborate

- Types of fiber optic cables.
- The concept of bend radius and its importance.
- The parts/components of optical fiber cables.
- VLF testing and its significance.

Demonstrate

- Demonstrate how to measure the bend radius of fiber optic cables using a bend radius tool.

Activity

1. **Activity name:** Fiber Optics Cable Assembly
2. **Objective:** To understand the components of an optical fiber cable and practice assembling them correctly.
3. **Type of Activity:** Group
4. **Resources:** Optical fiber cable samples, components of fiber optic cables
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into groups of 3-4.
   - Provide each group with optical fiber cable samples and components.
   - Instruct them to disassemble and reassemble the cable, identifying each component.
   - Encourage discussion and collaboration within the groups.
   - Facilitate a brief presentation from each group, highlighting their understanding of the cable assembly.
7. **Outcome:** Participants will gain hands-on experience with fiber optic cable assembly and deepen their understanding of its components.

Notes for Facilitation

- Ensure active participation and engagement from all participants.
- Encourage questions and foster a supportive learning environment.
- Provide real-world examples to illustrate concepts.
- Emphasize the practical applications of fiber optics in various industries.
- Remind participants to handle optical fiber components with care to avoid damage.

Unit 5.2: Installation of Optical Fibers

Unit Objectives

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

1. Distinguish fiber optic cable types and characteristics for in-building deployments
2. Demonstrate appropriate fiber handling practices
3. Describe the fiber cable components (strength members, cable sheath, core, cladding etc.)
4. Illustrate the VLF principal and testing features

Resources to be Used

Presentation slides or visual aids, samples of optical fibers, fusion splicing equipment, cable trays, conduits, and termination points, tools such as cable cutters, fusion splicers, cable ties, and cable management accessories, safety equipment including gloves, goggles, and appropriate attire, diagrams or illustrations of cabling paths and tray tracks, a workstation for fusion splicing demonstration

Say

- Welcome, everyone! Today, we're diving into the fascinating world of optical fiber installation.
- Our goal today is to understand the fundamentals of installing optical fibers, from fusion splicing to cable management techniques.
- By mastering these techniques, you'll be equipped to ensure efficient and reliable fiber optic networks, vital for modern communication systems.

Do

- Begin with an overview presentation covering the topics listed in the session objectives.
- Conduct demonstrations of fusion splicing and cable management techniques.
- Facilitate hands-on activities where participants practice laying fibers, managing cable slack, and securing termination points.
- Encourage questions and discussions throughout the session.

Ask

- How many of you have encountered fiber optic cables, such as in internet connections or telecommunications, in your daily lives?
- Can you think of any real-life examples where proper cable management could significantly affect performance or safety?
- Have you ever wondered how internet signals travel across vast distances at lightning speed?

Elaborate

- The optimal route for laying optical fibers to minimize interference and maximize efficiency.
- Techniques to prevent excess cable slack, ensuring neat and organized installations.
- How cable trays can support the weight of optical fibers before and after installation.
- How to position optical fibers within cable trays to prevent damage and maintain accessibility.
- Steps to navigate conduits to pull optical fibers without causing bends or kinks.
- Ways to terminate and secure excess fiber to prevent signal loss and maintain reliability.
- Installing optical fibers through conduits in false ceilings while ensuring compliance with safety regulations is challenging.

Demonstrate

Demonstrate fusion splicing by joining two optical fiber ends using a fusion splicer, illustrating the precision and technique required for a successful splice.

Activity

1. **Activity name:** Fiber Laying Simulation
2. **Objective:** To practice laying optical fibers along a designated path, considering factors such as cable slack and tray tracks.
3. **Type of Activity:** Group
4. **Resources:** Optical fiber samples, cable trays, diagrams of cabling paths
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into groups.
    - Provide each group with optical fiber samples and cable trays.
    - Instruct the groups to simulate laying fibers along a designated path.
    - Ensure that they focus on implementing proper cable management techniques.
    - Encourage discussions among the groups regarding any challenges encountered and best practices observed.
    - Facilitate the sharing of insights and solutions between groups to foster collaborative learning.
    - Monitor the activity to provide assistance and guidance as needed.
    - Emphasize the importance of precision and organization in cable laying to the participants.
    - Conclude the activity with a debrief session to recap key learnings and takeaways.
7. **Outcome:** Participants gain hands-on experience laying optical fibers and understanding the importance of proper cable management.

Notes for Facilitation

- Ensure a safe and organized workspace throughout the session.
- Encourage active participation and questions to facilitate better understanding.
- Emphasize the importance of precision and attention to detail in optical fiber installation.
- Provide additional resources or references for participants to explore further after the session.
- Demonstrate patience and readiness to assist participants in practical exercises and activities.

Unit 5.3: Testing Installed Network

Unit Objectives

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

1. Distinguish fiber optic cable types and characteristics for in-building deployments
2. Demonstrate appropriate fiber handling practices
3. Describe the fiber cable components (strength members, cable sheath, core, cladding etc.)
4. Illustrate the VLF principal and testing features

Resources to be Used

Visual Fault Locator (VFL) device, Fiber Detection Meter, Optical Network Terminal (ONT), Telecommunication Outlet (TO), Sample fiber optic cables, Safety goggles

Say

- Hello everyone! Welcome to today's session on Testing Installed Network. I hope you all are excited to explore this crucial aspect of network maintenance with you all.
- Today, we'll delve into the intricacies of Fiber Termination at Optical Network Terminal (ONT) & Telecommunication Outlet (TO), understand the functionality of Visual Fault Locator (VFL), and learn how to Test Live Fiber using Fiber Detection Meter.
- Understanding these concepts is essential for ensuring the efficiency and reliability of our network installations. By mastering these techniques, we can troubleshoot issues effectively, minimize downtime, and maintain optimal performance.

Do

- Begin with a brief overview of the topics to be covered.
- Demonstrate the proper use of the Visual Fault Locator (VFL) and Fiber Detection Meter.
- Conduct hands-on activities for terminating fiber at ONT and TO, ensuring participants understand the process thoroughly.

Ask

- Can anyone share an experience where they faced connectivity issues with their internet or phone service?
- How do you think fiber optic cables differ from traditional copper cables in installation and maintenance?
- In what ways do you think testing live fiber could be beneficial in a real-life networking scenario?

Elaborate

- The Fiber Termination Points: Understand the location and significance of Optical Network Terminal (ONT) and Telecommunication Outlet (TO) in a network setup.
- About faults and abnormalities in fiber optic cables using Visual Fault Locator (VFL).
- The technique of testing live fiber using Fiber Detection Meter for accurate diagnostics.

Demonstrate

Show how to properly connect and use the Visual Fault Locator (VFL) to detect faults in fiber optic cables.

Activity

1. **Activity name:** Fiber Termination Simulation
2. **Objective:** To practice terminating fiber at ONT and TO points accurately.
3. **Type of Activity:** Group
4. **Resources:** Sample fiber optic cables, ONT, TO, termination tools
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into groups.
   - Provide each group with the necessary tools and materials.
   - Instruct the groups to terminate fiber at designated ONT and TO points.
   - Emphasize following proper procedures for termination.
   - Monitor and assist groups as needed during the activity.
   - Encourage collaboration and communication within each group.
   - Ensure safety precautions are observed throughout the activity.
   - Allocate sufficient time for completion and review of the terminations.
   - Facilitate discussions on any challenges faced and lessons learned during the activity.
7. **Outcome:** Participants gain practical experience in fiber termination and an understanding of termination techniques.

Notes for Facilitation

- Ensure participants wear safety goggles during practical activities involving fiber termination.
- Encourage active participation and questions throughout the session.
- Emphasize the importance of precision and accuracy in fiber termination for optimal network performance.
- Provide additional resources or references for participants to explore further after the session.
- Remind participants to handle equipment and tools with care to prevent damage or injury.

Answers to Exercises for PHB

Multiple Choice Questions

1. a. Visual Fault Locator (VFL)
2. a. Bend radius
3. a. Core
4. a. Fusion Splicing
5. a. Fiber pulling

Answer the following:

1. Refer UNIT 5.1: Basics of Fiber Optics
   Topic 5.1.1 Types of Fiber Optics Cables
2. Refer UNIT 5.1: Basics of Fiber Optics
   Topic 5.1.3 Parts of Optical Fiber Cable
3. Refer UNIT 5.2: Installation of Optical Fibers
   Topic 5.2.2 Identify the Cabling Path
4. Refer UNIT 5.2: Installation of Optical Fibers
   Topic 5.2.6 Fiber Pulling Through Conduits
5. Refer UNIT 5.3: Testing Installed Network
   Topic 5.3.2 Visual Fault Locator (VFL)

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6. Configure Equipment and Establish Broadband Connectivity

Unit 6.1 - Network Topologies

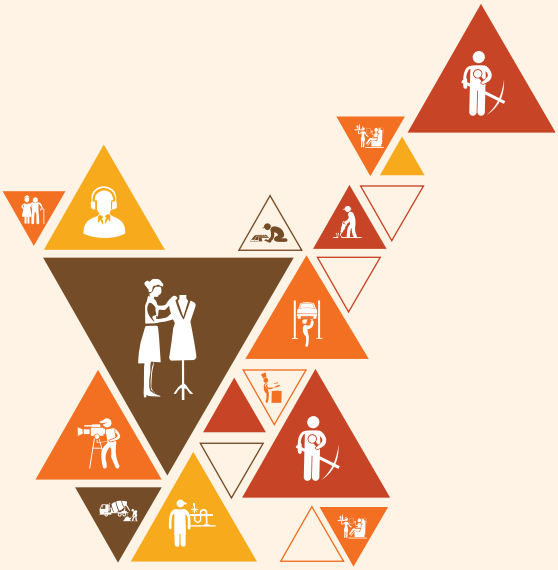
Unit 6.2 - Basic Commands

Unit 6.3 - Connectivity of CPE and End User Devices

Unit 6.4 - Configuration Testing

Unit 6.5 - Comprehension and Interpretation of Technical Data

Unit 6.6 - Executing Speed Test and Analyze



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Key Learning Outcomes

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

1. Demonstrate cable installation through cable trays (horizontal/vertical)
2. Show how to install cables through conduits
3. Show how to install cables through the false ceiling
4. Illustrate the procedure for terminations at ONT and TO

Unit 6.1: Network Topologies

Unit Objectives

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

1. Understand the network topologies

Resources to be Used

Presentation slides covering network topologies, diagrams illustrating various network topologies (star, bus, ring, mesh, etc.), whiteboard and markers, printed handouts summarizing key points on network topologies

Say

- Welcome everyone! I'm thrilled to have you here for today's session on network topologies.
- By the end of this session, you'll clearly understand different network topologies, their advantages, and their applications.
- Understanding network topologies is crucial in designing and managing efficient and reliable computer networks, the backbone of modern communication and technology infrastructure.

Do

- Begin the session with a brief overview of the agenda.
- Present the information on network topologies using slides and diagrams.
- Encourage questions and discussions throughout the session to enhance understanding.

Ask

- What devices do you use to connect to the internet at home?
- Can you think of a situation where a network failure could have serious consequences in your daily life?
- How do you think data is transmitted between devices in a large office building?

Elaborate

- Different network topologies.
- The advantages and disadvantages of each network topology.
- The suitability of different network topologies for specific scenarios.

Demonstrate

Demonstrate how data flows in a star network topology using physical devices or a simulation.

Activity

1. **Activity name:** Topology Sorting Activity
2. **Objective:** To reinforce understanding of different network topologies.
3. **Type of Activity:** Group
4. **Resources:** Printed cards with descriptions of network topologies
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Provide each group with a set of printed cards describing different network topologies.
   - Ask groups to sort the cards into categories based on the type of network topology described.
   - Facilitate discussion and review the correct answers with the whole group.
7. **Outcome:** Improved understanding of network topologies through hands-on sorting activity.

Notes for Facilitation

- Keep the pace lively and engage participants with interactive discussions and activities.
- Encourage participants to relate concepts to real-world examples to deepen understanding.
- Highlight the importance of considering scalability, reliability, and cost when choosing a network topology.
- Emphasize the role of network topologies in shaping communication infrastructure and enabling modern technologies.

Answers to Exercises for PHB

Answer the following questions:

1. **Refer UNIT 6.1: Network Topologies**
   Topic: 6.1.1 Topology
2. **Refer UNIT 6.1: Network Topologies**
   Topic: 6.1.1 Topology
3. **Refer UNIT 6.1: Network Topologies**
   Topic: 6.1.2 Broadband Network Element

Multiple-choice Questions

1. b. Topology
2. b. Hybrid
3. d. 30
4. d. 172.16.45.12

Unit 6.2: Basic Commands

Unit Objectives

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

1. Understand the basic commands related to networking

Resources to be Used

Projector and screen Computers or laptops for participants, handouts with command lists, whiteboard and markers, internet connectivity for live demonstrations

Say

- Good morning, everyone! Welcome to today's session on Basic Commands.
- Today, we're going to explore IPCONFIG and PING commands, essential tools for network troubleshooting and configuration. By the end of this session, you'll understand how to use these commands effectively.
- Understanding IPCONFIG and PING is crucial for anyone working with networks. These commands provide valuable insights into network configurations and help diagnose connectivity issues, making you more effective in your role.

Do

- Begin with a brief overview of IPCONFIG and PING.
- Demonstrate each command step-by-step on the projector, explaining the output and its significance.
- Provide handouts with command lists for participants to reference.
- Encourage participants to follow along on their own devices and ask questions as needed.

Ask

- What are some situations in your daily life where understanding network connectivity could be beneficial?
- Have you ever encountered issues with your home or work network that you couldn't resolve? How did you try to troubleshoot them?
- Can you imagine any real-life examples where knowing about IPCONFIG or PING could have made a difference?

Elaborate

- How to use IPCONFIG to view and configure network settings.
- The different options and parameters are available with the IPCONFIG command.
- How PING is used to test network connectivity and troubleshoot connection issues.
- The various options and parameters of the PING command.

Demonstrate

Demonstrate how to use IPCONFIG to view current IP configuration details on a Windows machine.

Activity

1. **Activity name:** Command Exploration
2. **Objective:** To reinforce understanding of IPCONFIG and PING commands.
3. **Type of Activity:** Individual
4. **Resources:** Computers or laptops with internet access
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Ask participants to open a command prompt or terminal window on their computers.
   - Instruct them to use IPCONFIG to view their current network configuration.
   - Then, guide them using the PING command to test connectivity to a specific website or IP address.
   - Encourage participants to experiment with different options and parameters for both commands.
7. **Outcome:** Participants will gain hands-on experience using IPCONFIG and PING, reinforcing their understanding of these essential networking tools.

Notes for Facilitation

- Encourage active participation and questions throughout the session.
- Provide a supportive learning environment where everyone feels comfortable sharing their thoughts and experiences.
- Emphasize the importance of accurately interpreting command output to diagnose network issues effectively.
- Highlight common pitfalls or misconceptions when using IPCONFIG and PING, such as incorrect syntax or misinterpreting results.
- Encourage participants to practice using these commands regularly to build confidence and proficiency.

Answers to Exercises for PHB

Fill in the blanks:

1. “Ipconfig” command stands for “Internet Protocol Configuration.”
2. Ipconfig displays all current “IP” (Internet Protocol) “addresses” and refreshes “DHCP” (Dynamic Host Configuration Protocol) settings.
3. “Ipconfig” command flushes the DNS cache.
4. The command which refreshes DHCP registers is “Ipconfig /registerdns.”
5. “Ipconfig /displaydns” command displays the contents of DNS cache.
6. “Ipconfig /release” command is useful while troubleshooting intermittent connections.
7. The switch “/n” is used to set the number of pings.
8. “Ping” is a primary TCP/IP command and is used to troubleshoot connectivity, name resolution, and reachability.
9. To ping a website “ping [website URL or IP address]” command is used.
10. “Ping -t” will continue to run the ping process till Ctrl + C is used to stop.

Unit 6.3: Connectivity of CPE and End User Devices

Unit Objectives

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

1. Understand the connectivity of CPE and End-User Devices
2. Understand the configuration of CPE and End-User Devices

Resources to be Used

Presentation slides on broadband connectivity, whiteboard and markers examples of cpe (customer premises equipment) and end-user devices, internet connection for live demonstrations, handouts or digital copies of relevant articles or case studies

Say

- Welcome, everyone! I'm thrilled to have you all here today to delve into the fascinating world of broadband connectivity.
- Today, we'll explore the crucial topic of connectivity between CPE and end-user devices, understanding how broadband plays a pivotal role in modern communication.
- Understanding connectivity is essential in today's interconnected world. It empowers us to troubleshoot issues effectively, optimize network performance, and ultimately enhance user experience.

Do

- Start the session with an icebreaker activity to gauge participants' familiarity with the topic.
- Present key concepts using slides and engage participants in discussions.
- Encourage hands-on exploration with demonstration devices to reinforce learning.

Ask

- How many of you use broadband internet at home? What are some devices you connect to it?
- Can you recall a situation where poor connectivity affected your productivity or enjoyment?
- Have you ever encountered challenges setting up a new device on your home network? What were they?

Elaborate

- Types of CPE and end-user devices
- Broadband technologies and their impact on connectivity
- The importance of network protocols in establishing connections
- Common issues and troubleshooting techniques related to connectivity

Demonstrate

Demonstrate how to connect a new device (e.g., a smart TV or gaming console) to a home broadband network.

Activity

1. **Activity name:** Network Setup Challenge
2. **Objective:** To apply knowledge of broadband connectivity by setting up a simulated network.
3. **Type of Activity:** Group
4. **Resources:** Routers, cables, laptops, simulation software (if available)
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into groups.
   - Provide each group with the necessary resources.
   - Instruct them to set up a functional network.
   - Ensure proper connectivity between CPE and end-user devices.
   - Encourage troubleshooting and collaboration among group members.
7. **Outcome:** Participants gain hands-on experience in configuring network setups and troubleshooting connectivity issues.

Notes for Facilitation

- Maintain a supportive and inclusive learning environment.
- Encourage active participation and collaboration among participants.
- Emphasize the importance of security measures in maintaining safe connectivity.
- Provide real-world examples of connectivity challenges and their solutions.
- Encourage participants to share their experiences and insights throughout the session.

Answers to Exercises for PHB

1. Refer UNIT 6.3: Connectivity of CPE and End User Devices
   Topic: 6.3.1 Broadband Connectivity
2. Refer UNIT 6.3: Connectivity of CPE and End User Devices
   Topic: 6.3.1 Broadband Connectivity
3. Refer UNIT 6.3: Connectivity of CPE and End User Devices
   Topic: 6.3.2 Connectivity

Unit 6.4: Configuration Testing

Unit Objectives

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

1. Understand the connectivity of CPE and End-User Devices
2. Understand the configuration of CPE and End-User Devices

Resources to be Used

Windows 11 laptop or desktop computer, projector or screen for demonstration, handouts or slides with step-by-step instructions, pen and paper for note-taking

Say

- Welcome, everyone! Today, we're diving into the world of configuration testing in Windows 11.
- Our goal today is to understand how to verify IP addresses for both WiFi and Ethernet connections in Windows 11.
- Knowing how to verify IP addresses is essential for troubleshooting network connectivity issues and ensuring smooth operation of your Windows 11 system.

Do

- Start by explaining the concept of IP addresses and their significance in network communication.
- Demonstrate how to verify the IP address for both WiFi and Ethernet connections in Windows 11.
- Provide hands-on practice opportunities for participants to verify IP addresses on their own devices.

Ask

- What are some daily situations where you might need to check your device's IP address?
- Can you think of a time when knowing your IP address helped you troubleshoot a network problem?
- How do you think understanding IP configuration can improve your overall experience with Windows 11?

Elaborate

- About locating and identifying their device's IP address.
- How to check the IP address for a WiFi connection.
- The process of verifying the IP address for an Ethernet connection.

Demonstrate

Demonstrate how to verify the IP address for a WiFi connection on a Windows 11 device.

Activity

1. **Activity name:** IP Address Hunt
2. **Objective:** To reinforce the understanding of verifying IP addresses for WiFi and Ethernet connections.
3. **Type of Activity:** Group
4. **Resources:** Handouts with IP address verification instructions
5. **Time Duration:** 20-35 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Provide each group with a list of tasks.
   - Tasks include verifying IP addresses for different network connections on Windows 11.
   - The group that completes all tasks first wins.
7. **Outcome:** Participants will gain practical experience verifying IP addresses and working collaboratively to troubleshoot network configurations.

Notes for Facilitation

- Maintain an engaging and interactive atmosphere throughout the session.
- Encourage participants to ask questions and share their experiences related to network troubleshooting.
- Emphasize the importance of accurate IP configuration for smooth network operation.
- Provide additional resources or support for participants who may need further assistance with configuration testing in Windows 11.
- Remind participants to apply their newfound knowledge in real-world scenarios to enhance their proficiency.

Answers to Exercises for PHB

1. Refer UNIT 6.4: Configuration Testing
   Topic: 6.4.1 Verifying IP address in Windows 11 for WiFi
2. Refer UNIT 6.4: Configuration Testing
   Topic: 6.4.1 Verifying IP address in Windows 11 for WiFi
3. Refer UNIT 6.4: Configuration Testing
   Topic: 6.4.2 Verifying IP address in Windows 11 for Ethernet

Unit 6.5: Comprehension and Interpretation of Technical Data

Unit Objectives

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

1. Comprehend and interpret technical data

Resources to be Used

Whiteboard and markers, handouts with technical data examples, projector and screen for multimedia presentations

Say

- Welcome everyone! Today, we're diving into the fascinating world of comprehension and interpretation of technical data.
- Our goal today is to equip you with the skills to effectively understand and interpret technical data, crucial for making informed decisions in your professional roles.
- Understanding technical data empowers you to solve problems, optimize processes, and innovate in your respective fields. It's the key to unlocking opportunities and driving success in the modern workplace.

Do

- Start with an overview of the importance of comprehension and interpretation of technical data.
- Engage participants with interactive discussions and real-life examples.
- Provide practical exercises and activities to reinforce learning.

Ask

- How do you encounter technical data in your daily life, even outside of work?
- Can you think of a situation where misinterpreting technical data could lead to serious consequences?
- What are some common challenges you face when trying to comprehend technical data?

Elaborate

- Trends and patterns within technical data sets.
- The crucial information from complex technical documents.
- Utilizing charts, graphs, and diagrams to communicate technical information effectively.
- Statistical methods and tools for data analysis.

Demonstrate

Demonstrate how to interpret a technical graph or chart, highlighting key data points and trends.

Activity

1. **Activity name:** Data Analysis Challenge
2. **Objective:** To apply comprehension and interpretation skills to real-world data sets.
3. **Type of Activity:** Group
4. **Resources:** Handouts with sample data sets, whiteboard, markers
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into groups.
   - Provide each group with a different data set.
   - Instruct groups to analyze the data.
   - Encourage them to identify trends within the data.
   - Ask groups to collaborate and discuss their findings.
   - Instruct each group to present their findings to the class.
   - Encourage discussion and interaction among all participants during the presentations.
7. **Outcome:** Improved ability to comprehend and interpret technical data, enhanced teamwork and communication skills.

Notes for Facilitation

- Arrive early to set up the necessary materials and technology.
- Encourage active participation and create a supportive learning environment.
- Provide constructive feedback during activities to reinforce learning.
- Clarify any technical terms or concepts that may be unfamiliar to participants.
- Emphasize the practical application of comprehension and interpretation skills in participants' professional roles.

Answers to Exercises for PHB

1. Refer UNIT 6.5: Comprehension and Interpretation of Technical Data
   Topic: 6.5.1 Interpretation of Technical Data
2. Refer UNIT 6.5: Comprehension and Interpretation of Technical Data
   Topic: 6.5.1 Interpretation of Technical Data
3. Refer UNIT 6.5: Comprehension and Interpretation of Technical Data
   Topic: 6.5.1 Interpretation of Technical Data

Unit 6.6: Executing Speed Test and Analyze

Unit Objectives

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

1. Understand how to run, read and communicate speed tests

Resources to be Used

Presentation slides, whiteboard and markers, handouts on speed test measures, pen and paper for participants

Say

- Welcome everyone! Let's dive into the topic of executing speed tests and analysis with you today.
- Today's objective is to understand the importance of speed tests in our work, how to effectively communicate with clients about them, and why mastering this skill is crucial for our success.
- By mastering speed test execution and analysis, we can ensure the efficiency and reliability of our work, leading to increased client satisfaction and better project outcomes.

Do

- Start the session with an overview of the agenda.
- Present the key concepts of executing speed tests and analysis.
- Facilitate discussions and activities to reinforce learning.

Ask

- What are some examples of daily tasks where speed is critical?
- Can you think of a time when communication about deadlines or project timelines with a client was challenging? How did you handle it?
- How do you think improving speed test execution and analysis can benefit our projects and client relationships?

Elaborate

- Performance bottlenecks in systems.
- Various tools for conducting speed tests.
- Test results for optimization opportunities.

Demonstrate

Demonstrate how to use a performance monitoring tool to conduct a speed test on a website.

Activity

1. **Activity name:** Website Speed Test Challenge
2. **Objective:** To practice executing and analyzing speed tests for websites.
3. **Type of Activity:** Group
4. **Resources:** Computers with internet access, performance testing tools (e.g., Google PageSpeed Insights, GTmetrix)
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into groups.
   - Instruct each group to select a website for speed analysis.
   - Provide tools for conducting speed tests (e.g., Google PageSpeed Insights, GTmetrix).
   - Direct groups to conduct speed tests on their chosen websites.
   - Guide groups to analyze the test results to identify areas for improvement.
   - Allocate time for groups to prepare their presentations.
   - Have each group present their findings to the class, highlighting key insights and proposed optimizations.
7. **Outcome:** Participants will gain hands-on experience in conducting speed tests and interpreting the results.

Notes for Facilitation

- Encourage active participation and discussion throughout the session.
- Provide additional resources for further learning, such as articles or tutorials on speed testing.
- Emphasize the importance of regular speed testing as part of the development process.
- Highlight the role of effective communication with clients in setting realistic expectations regarding project timelines and performance optimization efforts.
- Offer personalized assistance to participants who may need extra support understanding the concepts or tools introduced during the session.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 6.6: Executing Speed Test and Analyze
   Topic: 6.6.1 Speed Test measures
2. Refer UNIT 6.6: Executing Speed Test and Analyze
   Topic: 6.6.1 Speed Test measures

Multiple-choice Questions

1. Ping
2. Ookla Speedtest
3. Megabits per second (Mbps)
4. 125 kilobytes per second (KBps); 1000 megabits per second (Mbps)
5. Ethernet
6. Communicating

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Telecom
Sector
Skill
Council

7. Troubleshoot and Rectify Faults

Unit 7.1 - Escalation Matrix

Unit 7.2 - Problem Solving

Unit 7.3 - Identifying and Repairing Faulty Cables and Connectors

Unit 7.4 - Electro Magnetic Interference (EMI) and Compatibility (EMC)

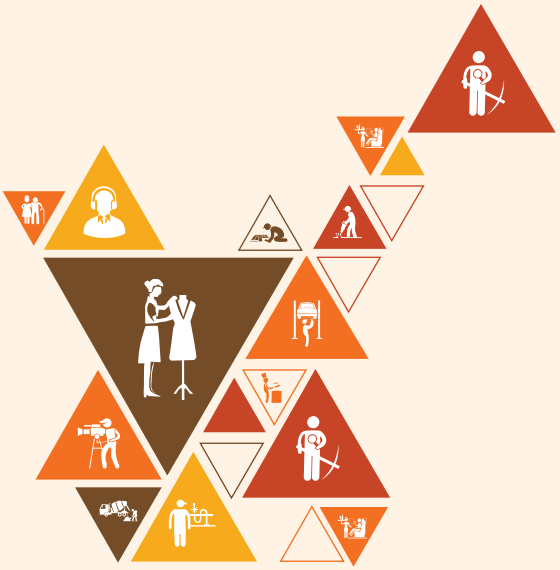
Unit 7.5 - Crimping and Soldering

Unit 7.6 - Troubleshooting of Cable and Connector

Unit 7.7 - Troubleshooting of CPE (Modem, Router, Switch)

Unit 7.8 - Troubleshooting Configuration and Connectivity of CPE Faults

Unit 7.9 - Troubleshooting and Repairing of Client's Broadband Service



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Key Learning Outcomes

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

1. State the importance and function of escalation matrix.
2. Understand the process of problem-solving.
3. Understand how to identify cables and connectors correctly.
4. Understand the importance of EMI and EMC.
5. Understand the process of crimping and soldering.
6. Demonstrate troubleshooting of cable and connector.
7. Demonstrate troubleshooting of CPE (Modem, Router, and Switch).
8. Demonstrate the troubleshooting of configuration and connectivity

Unit 7.1: Escalation Matrix

Unit Objectives

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

1. State the importance and function of escalation matrix

Resources to be Used

Presentation slides on escalation matrix, whiteboard and markers, handouts or worksheets explaining escalation matrix concepts, case studies or scenarios related to escalation situations, flipchart paper and sticky notes for group activities

Say

- Hello everyone, welcome to today's session on Escalation Matrix! I'm excited to dive into this topic with you all.
- Today, we'll explore the Escalation Matrix and understand its importance in managing conflicts and issues effectively within our organization.
- Understanding the Escalation Matrix can help us navigate challenging situations at work more efficiently, ensuring that problems are addressed promptly and appropriately.

Do

- Begin the session with a brief overview of the Escalation Matrix concept.
- Engage participants in discussions about the importance of having a structured escalation process.
- Use case studies or scenarios to illustrate different levels of escalation and how they should be handled.
- Facilitate group activities where participants can practice applying the Escalation Matrix to various workplace situations.
- Encourage active participation and open dialogue throughout the session.

Ask

- How many of you have encountered situations at work where issues escalated unnecessarily?
- Can you share an example of a recent workplace conflict or problem that required escalation?
- What do you think are the consequences of not having a clear escalation process in place?

Elaborate

- About the early signs of potential issues that may require escalation.
- The severity and impact of the problem before determining the appropriate level of escalation.
- The established process for escalating issues to the relevant stakeholders or decision-makers.
- How to keep parties informed throughout the escalation process to ensure transparency and accountability.
- Ways to find solutions and address the underlying issues causing the escalation.

Demonstrate

Demonstrate the process of escalating an issue using a simple role-play scenario, showing how different stakeholders are involved at each stage of the escalation process.

Activity

1. **Activity name:** Escalation Role-Play
2. **Objective:** To practice applying the Escalation Matrix in various workplace scenarios.
3. **Type of Activity:** Group
4. **Resources:** Case studies/scenarios, flipchart paper, sticky notes
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Divide participants into small groups.
    - Provide each group with a different case study or scenario involving a potential escalation situation.
    - In their groups, participants should discuss and decide how they would escalate the issue according to the Escalation Matrix.
    - Groups present their escalation plans to the rest of the participants.
    - Facilitate a debrief discussion to analyze the effectiveness of each group's escalation approach.
7. **Outcome:** Participants gain practical experience in applying the Escalation Matrix and learn from each other's perspectives.

Notes for Facilitation

- Keep the session interactive and encourage active participation from all participants.
- Foster a safe and supportive environment where participants feel comfortable sharing their experiences and insights.
- Emphasize the importance of clear communication and documentation throughout the escalation process.
- Remind participants to consider the potential impact of their actions at each stage of escalation.
- Encourage reflection and discussion on how participants can apply the concepts learned in this session to their own work environments.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.1: Escalation Matrix
   Topic: 7.1.1 Escalation Matrix
2. Refer UNIT 7.1: Escalation Matrix
   Topic: 7.1.1 Escalation Matrix
3. Refer UNIT 7.1: Escalation Matrix
   Topic: 7.1.2 Escalation Matrix Format

Unit 7.2: Problem Solving

Unit Objectives

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

1. Understand the process of problem solving

Resources to be Used

Whiteboard and markers, Presentation slides or flipchart, Handouts with problem-solving frameworks or techniques, Case studies or real-life examples, Timer or clock

Say

- Hello everyone! Welcome to today's session on problem solving. I'm excited to dive into this topic with you all.
- Today, we'll learn about the key steps in problem solving, including reporting the problem, solving it effectively, and following up to ensure long-term solutions.
- Problem-solving skills are essential in both personal and professional life. By mastering these techniques, you'll be better equipped to tackle challenges and overcome obstacles with confidence.

Do

- Start with an overview of the problem-solving process.
- Use case studies or real-life examples to illustrate each step.
- Encourage participation and discussion throughout the session.

Ask

- What is a recent problem you encountered in your daily life, and how did you address it?
- Can you think of a time when a problem escalated because it wasn't addressed promptly? What were the consequences?
- Have you ever been part of a successful problem-solving team? What made the experience effective?

Elaborate

- Steps to identify the Problem.
- The information and identify possible causes.
- Potential solutions and evaluate their feasibility.
- Actions to address the problem effectively.
- The solution's effectiveness and make adjustments as needed.

Demonstrate

Demonstrate how to use a problem-solving framework, such as the "5 Whys" or the "Fishbone Diagram," to analyze and address a common issue.

Activity

1. **Activity name:** Problem-Solving Simulation
2. **Objective:** Apply problem-solving techniques to a realistic scenario.
3. **Type of Activity:** Group
4. **Resources:** Case study handouts, whiteboard, markers
5. **Time Duration:** 25 minutes
6. **Instructions:**
   - Divide participants into small groups.
   - Distribute the case study handouts and explain the scenario.
   - Instruct each group to analyze the problem, generate solutions, and develop an action plan.
   - Encourage groups to use problem-solving frameworks discussed in the session.
   - Allow time for groups to present their solutions and discuss their approaches.
7. **Outcome:** Participants will practice applying problem-solving techniques in a collaborative setting.

Notes for Facilitation

- Foster a supportive and inclusive environment where everyone feels comfortable sharing their thoughts and ideas.
- Encourage active participation and engagement throughout the session.
- Emphasize the importance of clear communication and collaboration when solving problems as a team.
- Remind participants to consider both short-term and long-term implications when evaluating potential solutions.
- Highlight the value of continuous improvement and learning from past experiences to enhance problem-solving skills.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.2: Problem Solving
   Topic: 7.2.2 Solving the Problem
2. Refer UNIT 7.2: Problem Solving
   Topic: 7.2.3 Following up after the Problem
3. Refer UNIT 7.2: Problem Solving
   Topic: 7.2.4 Checklist

Unit 7.3: Identifying and Repairing Faulty Cables and Connectors

Unit Objectives

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

1. Understand how to identify faulty cables and connectors correctly
2. Test the cables using signal level meters / OTDR
3. Repair and replace faulty connectors or damaged cables

Resources to be Used

Faulty cables and connectors for demonstration, OTDR (Optical Time Domain Reflectometer) or Signal Level Meters for cable testing, RJ-45 connectors, Ethernet cables, Wire strippers and crimping tools, Multimeter, Cable tester, Safety gloves and goggles

Say

- Welcome, everyone! Today, we're diving into the essential skill of identifying and repairing faulty cables and connectors.
- Our goal today is to equip you with the knowledge and hands-on experience needed to effectively troubleshoot and fix cable and connector issues.
- Understanding how to identify and repair faulty cables and connectors not only ensures smooth network operations but also saves time and resources by avoiding unnecessary replacements and downtime.

Do

- Begin by discussing common cable and connector issues and their impact on network performance.
- Demonstrate proper cable testing techniques using an OTDR or Signal Level Meter.
- Guide participants through the process of connecting a cable to an RJ-45 connector, emphasizing proper termination and crimping techniques.

Ask

- What are some common issues you've encountered with cables and connectors in your daily life or work?
- Can you share an example of how a faulty cable or connector caused disruption or inconvenience?
- How do you think understanding cable and connector troubleshooting can benefit you in your role?

Elaborate

- Common cable and connector faults.
- About test cables using OTDR or Signal Level Meters.
- Ways to connect cables to RJ-45 connectors.

Demonstrate

Demonstrate how to properly strip, terminate, and crimp an Ethernet cable onto an RJ-45 connector.

Activity

1. **Activity name:** Cable Termination Challenge
2. **Objective:** Practice terminating Ethernet cables onto RJ-45 connectors accurately.
3. **Type of Activity:** Individual
4. **Resources:** Ethernet cables, RJ-45 connectors, wire strippers, crimping tools
5. **Time Duration:** 30 minutes
6. **Instructions:**
   - Provide each participant with an Ethernet cable, RJ-45 connector, wire strippers, and crimping tool.
   - Instruct participants to strip the cable, terminate it onto the connector, and crimp it following proper techniques.
   - Observe and provide guidance as needed.
   - Once completed, test each termination using a cable tester.
7. **Outcome:** Participants gain hands-on experience and confidence in properly terminating Ethernet cables.

Notes for Facilitation

- Keep the session interactive by encouraging questions and participation.
- Provide individual feedback during hands-on activities to ensure proper technique.
- Emphasize the importance of safety precautions when handling tools and equipment.
- Highlight the significance of proper cable management and labeling for future troubleshooting efforts.
- Encourage participants to apply what they've learned in real-world scenarios to reinforce understanding.

Answers to Exercises for PHB

Answer the following questions:

1. OTDR (Optical Time Domain Reflectometer)
2. Analog and digital Signal Level Meters

Unit 7.4: Electro Magnetic Interference (EMI) and Compatibility (EMC)

Unit Objectives

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

1. Understand the importance of EMI and EMC.

Resources to be Used

Presentation slides on EMI and EMC, whiteboard and markers, examples of devices affected by EMI/EMC issues, handouts summarizing key concepts, demonstrative materials such as shielding materials or EMI filters

Say

- Welcome, everyone! Today, we're diving into the fascinating world of Electro Magnetic Interference (EMI) and Compatibility (EMC).
- Objective for the Session: "Our goal today is to understand the importance of EMI/EMC, how it affects our daily lives, and how to mitigate its effects.
- Understanding EMI/EMC is crucial in ensuring the reliability and safety of electronic devices we use every day. Whether it's your smartphone, Wi-Fi router, or medical equipment, EMI/EMC considerations are essential for functionality and user safety.

Do

- Introduce the concept of EMI and EMC with clear definitions and examples.
- Discuss the causes and effects of EMI, highlighting common sources such as power lines, radio waves, and electronic devices.
- Explain the importance of EMC standards and regulations in ensuring device reliability and safety.

Ask

- What electronic devices do you use daily, and have you ever experienced any interference issues with them?
- Can you think of any real-life examples where EMI/EMC considerations are crucial for safety or functionality?
- How do you think understanding EMI/EMC can benefit you in your future career or daily life?

Elaborate

- Sources of EMI
- The impact of EMI on electronic devices
- Methods for mitigating EMI
- EMC standards and regulations
- The importance of EMC testing and certification

Demonstrate

Demonstrate how shielding materials can effectively reduce EMI interference by comparing signal strength with and without the shield in place.

Activity

1. **Activity name:** EMI Shielding Activity
2. **Objective:** To understand how shielding materials mitigate EMI interference.
3. **Type of Activity:** Group
4. **Resources:** Shielding materials (metal plates, conductive fabric), electronic device emitting EMI signals, measuring equipment
5. **Time Duration:** 30 minutes
6. **Instructions:**
   - Divide participants into groups.
   - Provide each group with shielding materials and an electronic device emitting EMI signals.
   - Instruct them to measure the signal strength without any shielding.
   - Then, have them apply the shielding material and measure the signal strength again.
   - Discuss the results as a group and draw conclusions about the effectiveness of shielding materials in reducing EMI interference.
7. **Outcome:** Participants gain hands-on experience and understanding of how shielding materials can mitigate EMI interference.

Notes for Facilitation

- Keep the session interactive by encouraging questions and participation.
- Provide individual feedback during hands-on activities to ensure proper technique.
- Emphasize the importance of safety precautions when handling tools and equipment.
- Highlight the significance of proper cable management and labeling for future troubleshooting efforts.
- Encourage participants to apply what they've learned in real-world scenarios to reinforce understanding.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.4: Electro Magnetic Interference (EMI) and Compatibility (EMC)
   Topic: 7.4.1 Need of EMI & EMC
2. Refer UNIT 7.4: Electro Magnetic Interference (EMI) and Compatibility (EMC)
   Topic: 7.4.1 Need of EMI & EMC
3. Refer UNIT 7.4: Electro Magnetic Interference (EMI) and Compatibility (EMC)
   Topic: 7.4.1 Need of EMI & EMC

Unit 7.5: Crimping and Soldering

Unit Objectives

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

1. Understand the process of crimping and soldering.

Resources to be Used

Crimping tools and connectors, soldering iron and solder, wire strippers, safety goggles, electrical wires instructional diagrams or videos

Say

- Hello everyone! Welcome to today's session on crimping and soldering. I'm excited to dive into these essential techniques with you all.
- Today, we'll explore the differences between crimping and soldering, understand when to use each technique, and practice both methods hands-on.
- Whether you're a hobbyist, technician, or professional, mastering crimping and soldering skills is crucial for creating reliable electrical connections. By the end of this session, you'll feel confident in both techniques and their applications.

Do

- Begin by explaining the differences between crimping and soldering, including when each technique is typically used.
- Demonstrate proper crimping and soldering techniques, emphasizing safety precautions throughout.
- Provide ample opportunity for participants to practice both techniques with guidance and feedback.

Ask

- What are some examples of everyday items where you think crimping or soldering might be used?
- Have you ever encountered a situation where a faulty crimp or solder joint caused issues?
- Can you think of any safety precautions that should be taken when working with crimping or soldering tools?

Elaborate

- Components and tools required for crimping and soldering.
- The step-by-step process of crimping and soldering.
- The common applications and industries where crimping and soldering are used.
- The advantages and disadvantages of each technique.
- Key safety considerations when working with electrical connections.

Demonstrate

Demonstrate how to properly crimp a wire onto a connector using crimping tools.

Activity

1. **Activity name:** Crimping vs. Soldering
2. **Objective:** To compare and contrast crimping and soldering techniques.
3. **Type of activity:** Group
4. **Resources:** Crimping tools, soldering iron, wires, connectors
5. **Time Duration:** 25 minutes
6. **Instructions:**
    - Divide participants into small groups.
    - Provide each group with a set of wires, connectors, crimping tools, and a soldering iron.
    - Task each group with creating electrical connections using both crimping and soldering techniques.
    - Encourage groups to discuss the advantages and disadvantages of each method as they work.
    - After completion, reconvene as a whole group to share observations and insights.
7. **Outcome:** Participants will gain practical experience in both crimping and soldering while fostering a deeper understanding of their differences.

Notes for Facilitation

- Always prioritize safety when working with electrical tools and equipment.
- Encourage participants to ask questions and seek clarification throughout the session.
- Remind participants to practice proper technique and attention to detail during hands-on activities.
- Emphasize the importance of quality control and inspection when completing crimping and soldering tasks.
- Provide additional resources or references for participants to explore further after the session.=

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.5: Crimping and Soldering
   Topic: 7.5.2 Soldering
2. Refer UNIT 7.5: Crimping and Soldering
   Topic: 7.5.3 Crimping
3. Refer UNIT 7.5: Crimping and Soldering
   Topic: 7.5.2 Soldering, Topic: 7.5.3 Crimping

Fill in the blanks.

1. The tools used in soldering are soldering iron, solder wire, and flux.
2. Crimping and soldering are methods used to establish electrical connections.

Unit 7.6: Troubleshooting of Cable and Connector

Unit Objectives

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

1. Demonstrate troubleshooting of cable and connector.

Resources to be Used

Whiteboard and markers Projector and slides (if applicable), Sample cables and connectors, Router (for demonstration), Troubleshooting guides or manuals

Say

- Hello everyone! Welcome to today's session on troubleshooting cable and connector problems during first startup, and router issues. I'm excited to dive into these topics with you all today.
- Our goal today is to equip you with the knowledge and skills needed to effectively troubleshoot cable and connector issues during initial setup, and to address common problems encountered with routers.
- Understanding these topics is crucial for ensuring smooth operations in networking setups. Whether you're setting up a new network or troubleshooting an existing one, having the ability to diagnose and resolve cable, connector, and router issues is invaluable.

Do

- Start the session with a brief overview of the topics to be covered.
- Engage participants in interactive discussions and encourage questions throughout the session.
- Provide real-world examples and case studies to illustrate key concepts.
- Conduct hands-on activities or demonstrations to reinforce learning.
- Encourage participants to share their own experiences and insights.
- Summarize key takeaways and encourage further exploration of the topics.

Ask

- Have you ever experienced difficulties setting up a new device due to cable or connector issues?
- Can you think of a time when a router problem caused disruptions in your internet connection at home or work?
- How important do you think it is to be able to troubleshoot networking issues independently?

Elaborate

- Common cable and connector problems during first startup.
- Troubleshooting steps for diagnosing cable and connector issues.
- Common router problems and their causes.
- Methods for troubleshooting router issues.
- Case studies of real-world networking problems.

Demonstrate

Demonstrate how to properly connect cables and connectors, and how to navigate router settings to diagnose common issues such as IP address conflicts or firmware updates.

Activity

1. **Activity name:** Troubleshooting Simulation
2. **Objective:** To apply troubleshooting techniques for cable, connector, and router problems.
3. **Type of Activity:** Group
4. **Resources:** Sample cables, connectors, and a router
5. **Time Duration:** 25 minutes
6. **Instructions:**
    - Divide participants into small groups.
    - Provide each group with a set of sample cables, connectors, and a router.
    - Present each group with a scenario involving cable, connector, or router issues.
    - Instruct groups to diagnose and resolve the problem within the allotted time.
    - Facilitate discussions and provide guidance as needed.
    - Reconvene and discuss the outcomes of each group's troubleshooting efforts.
7. **Outcome:** Improved understanding of practical troubleshooting.

Notes for Facilitation

- Maintain an interactive and engaging atmosphere throughout the session.
- Encourage participation from all attendees and foster a supportive learning environment.
- Remind participants to take notes and ask questions as needed.
- Highlight the importance of systematic troubleshooting methods and critical thinking skills.
- Provide additional resources for further reading or practice, such as online tutorials or troubleshooting guides.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.6: Troubleshooting of Cable and Connector
   Topic: 7.6.1 Problems during First Startup
2. Refer UNIT 7.6: Troubleshooting of Cable and Connector
   Topic: 7.6.1 Problems during First Startup

Unit 7.7: Troubleshooting of CPE (Modem, Router, Switch)

Unit Objectives

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

1. Demonstrate troubleshooting of CPE (modem, router and switch).

Resources to be Used

Cable modems, routers, and switches for demonstration, a projector or screen for presenting slides or diagrams, Troubleshooting handouts or worksheets, internet access for live troubleshooting demonstrations, whiteboard or flip chart for visual aids

Say

- Welcome, everyone! I'm thrilled to dive into the world of troubleshooting CPE with you today.
- Our goal today is to equip you with the skills to diagnose and troubleshoot common issues with cable modems, routers, and switches.
- Understanding troubleshooting techniques is crucial in today's tech-driven world. It empowers us to solve problems independently and efficiently, saving time and frustration.

Do

- Introduce the session objectives and agenda.
- Engage participants with interactive discussions and activities.
- Demonstrate troubleshooting techniques using real devices.
- Facilitate hands-on practice sessions for participants.
- Provide guidance and support as participants work through troubleshooting scenarios.
- Summarize key takeaways and provide additional resources for further learning.

Ask

- What challenges have you faced when trying to troubleshoot internet connectivity at home?
- Can you share an experience when understanding the indicators on a device helped you troubleshoot a problem?
- How do you think mastering troubleshooting skills can benefit you in your daily life?

Elaborate

- Common issues with cable modems, routers, and switches.
- Indicators and error messages on CPE devices.
- Basic diagnostics to identify connectivity problems.
- Troubleshooting steps to resolve issues effectively.

Demonstrate

Demonstrate how to interpret indicator lights on a cable modem to identify connectivity issues.

Activity

1. **Activity name:** Troubleshooting Scenarios
2. **Objective:** Practice troubleshooting skills by identifying and resolving common connectivity issues.
3. **Type of Activity:** Group activity
4. **Resources:** Troubleshooting handouts, cable modems, routers, and switches
5. **Time Duration:** 30 minutes
6. **Instructions:**
   - Divide participants into small groups.
   - Provide each group with a troubleshooting scenario and necessary resources.
   - Instruct groups to diagnose the problem, propose solutions, and implement troubleshooting steps.
   - Facilitate discussions and offer guidance as needed.
   - Reconvene as a whole group to discuss solutions and share insights.
7. **Outcome:** Participants will practice diagnosing and resolving connectivity issues, improving their troubleshooting skills.

Notes for Facilitation

- Maintain an open and supportive atmosphere throughout the session.
- Encourage active participation and collaboration among participants.
- Provide constructive feedback and guidance during hands-on activities.
- Emphasize the importance of understanding indicator lights and error messages on CPE devices.
- Encourage participants to approach troubleshooting systematically, starting with basic diagnostics before moving to more advanced techniques.
- Remind participants to document their troubleshooting steps for future reference.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.7: Troubleshooting of CPE (Modem, Router, Switch)
   Topic: 7.7.1 Diagnosing the Cable Modem
2. Refer UNIT 7.7: Troubleshooting of CPE (Modem, Router, Switch)
   Topic: 7.7.3 Trouble shooting using the Cable Modem Indicators
3. Refer UNIT 7.7: Troubleshooting of CPE (Modem, Router, Switch)
   Topic: 7.7.2 Troubleshoot a Cable Broadband Connection

Unit 7.8: Troubleshooting Configuration and Connectivity of CPE Faults

Unit Objectives

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

1. Troubleshoot configuration and connectivity.

Resources to be Used

Whiteboard and markers, projector and screen for presentation, troubleshooting guide or documentation, sample CPE (customer premises equipment) setup for demonstration

Say

- Hello everyone, and welcome to today's session on troubleshooting configuration and connectivity of CPE faults!
- Today, we'll be focusing on understanding and troubleshooting the common issue of "No Data Transfer" in CPE setups, aiming to equip you with the skills to effectively address this challenge.
- Understanding how to troubleshoot "No Data Transfer" issues is crucial for ensuring seamless connectivity for our clients. By mastering this skill, you'll be able to quickly diagnose and resolve connectivity issues, minimizing downtime and enhancing customer satisfaction.

Do

- Review the troubleshooting guide or documentation to familiarize yourself with the steps.
- Prepare the sample CPE setup for demonstration purposes.
- Organize any additional materials or resources needed for the session.

Ask

- What challenges have you faced in troubleshooting connectivity issues in your previous experiences?
- Can you recall a situation where "No Data Transfer" caused significant disruptions? How was it resolved?
- How do you think understanding troubleshooting techniques can benefit both clients and service providers?

Elaborate

- The source of the issue using diagnostic tools.
- Ways to verify network configurations and settings.
- About physical connections and cables for any faults.
- The data transfer logs for abnormalities.
- About alternative connectivity options if necessary.

Demonstrate

Demonstrate the process of identifying and resolving a “No Data Transfer” issue in a sample CPE setup, highlighting each step of the troubleshooting process.

Activity

1. **Activity name:** Troubleshooting Model
2. **Objective:** Apply troubleshooting techniques to diagnose and resolve a simulated “No Data Transfer” issue.
3. **Type of Activity:** Group
4. **Resources:** Sample CPE setup, troubleshooting guide, whiteboard
5. **Time Duration:** 30 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Provide each group with a simulated scenario of a “No Data Transfer” issue.
   - Instruct groups to work together to identify potential causes of the problem.
   - Encourage groups to devise a troubleshooting plan.
   - Allow 20 minutes for groups to brainstorm and discuss.
   - Reconvene as a whole group after the allocated time.
   - Facilitate a discussion where each group shares their proposed solutions.
   - Compare the proposed solutions with the correct troubleshooting steps as a group.
7. **Outcome:** Participants will gain hands-on experience in applying troubleshooting techniques to real-world scenarios, enhancing their problem-solving skills in resolving connectivity issues.

Notes for Facilitation

- Maintain an interactive and engaging environment throughout the session to encourage active participation.
- Encourage participants to ask questions and share their experiences related to troubleshooting connectivity issues.
- Remind participants to approach troubleshooting systematically, starting with the most common causes before moving on to more complex solutions.
- Provide constructive feedback and guidance during the activity to reinforce learning outcomes.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.8: Troubleshooting Configuration and Connectivity of CPE faults
   Topic: 7.8.1 Troubleshoot “No Data Traner”
2. Refer Refer UNIT 7.8: Troubleshooting Configuration and Connectivity of CPE faults
   Topic: 7.8.1 Troubleshoot “No Data Traner”

Unit 7.9: Troubleshooting and Repairing of Client's Broadband Service

Unit Objectives

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

1. Understand common causes of broken Internet connection
2. Learn how to diagnose Internet connection

Resources to be Used

Presentation slides on troubleshooting broadband issues, whiteboard and markers, sample troubleshooting scenarios handout, internet connectivity testing tools (such as ping, traceroute), diagrams or visuals illustrating broadband network architecture

Say

- Welcome, everyone! Today, we're diving into the fascinating world of troubleshooting and repairing client broadband services.
- Our goal today is to equip you with the skills and knowledge to effectively diagnose and resolve common issues with internet connectivity.
- Understanding troubleshooting techniques not only enhances customer satisfaction but also boosts your confidence and efficiency in resolving technical issues.

Do

- Start the session by setting clear expectations and objectives.
- Engage participants in discussions and encourage active participation.
- Use real-life examples and scenarios to illustrate troubleshooting concepts.
- Facilitate hands-on activities and demonstrations to reinforce learning.
- Encourage questions and provide constructive feedback throughout the session.
- Summarize key takeaways and provide additional resources for further learning.

Ask

- What are some common issues you face with your internet connection at home?
- Can you share an experience where troubleshooting your internet connection was challenging?
- How important do you think it is for a broadband service provider to offer reliable technical support?

Elaborate

- Identify Common Issues: Recognize symptoms of broken internet connections.
- Diagnose Connectivity Problems: Utilize diagnostic tools to pinpoint the root cause.
- Troubleshooting Techniques: Apply systematic approaches to resolve connectivity issues.

Demonstrate

Conduct a live demonstration of using ping and traceroute commands to diagnose network connectivity problems.

Activity

1. **Activity name:** Troubleshooting Actuation
2. **Objective:** To apply troubleshooting techniques to resolve common internet connectivity issues.
3. **Type of Activity:** Group
4. **Resources:** Sample troubleshooting scenarios handout, internet connectivity testing tools
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Distribute the sample troubleshooting scenarios handout.
   - Instruct each group to analyze the scenarios and identify the possible causes of the connectivity issues.
   - Encourage groups to use internet connectivity testing tools to verify their hypotheses and propose solutions.
   - Facilitate group discussions and provide guidance as needed.
   - After 20 minutes, reconvene as a whole group to discuss the solutions and share insights.
7. **Outcome:** Participants will demonstrate their ability to diagnose and resolve common internet connectivity issues through collaborative problem-solving.

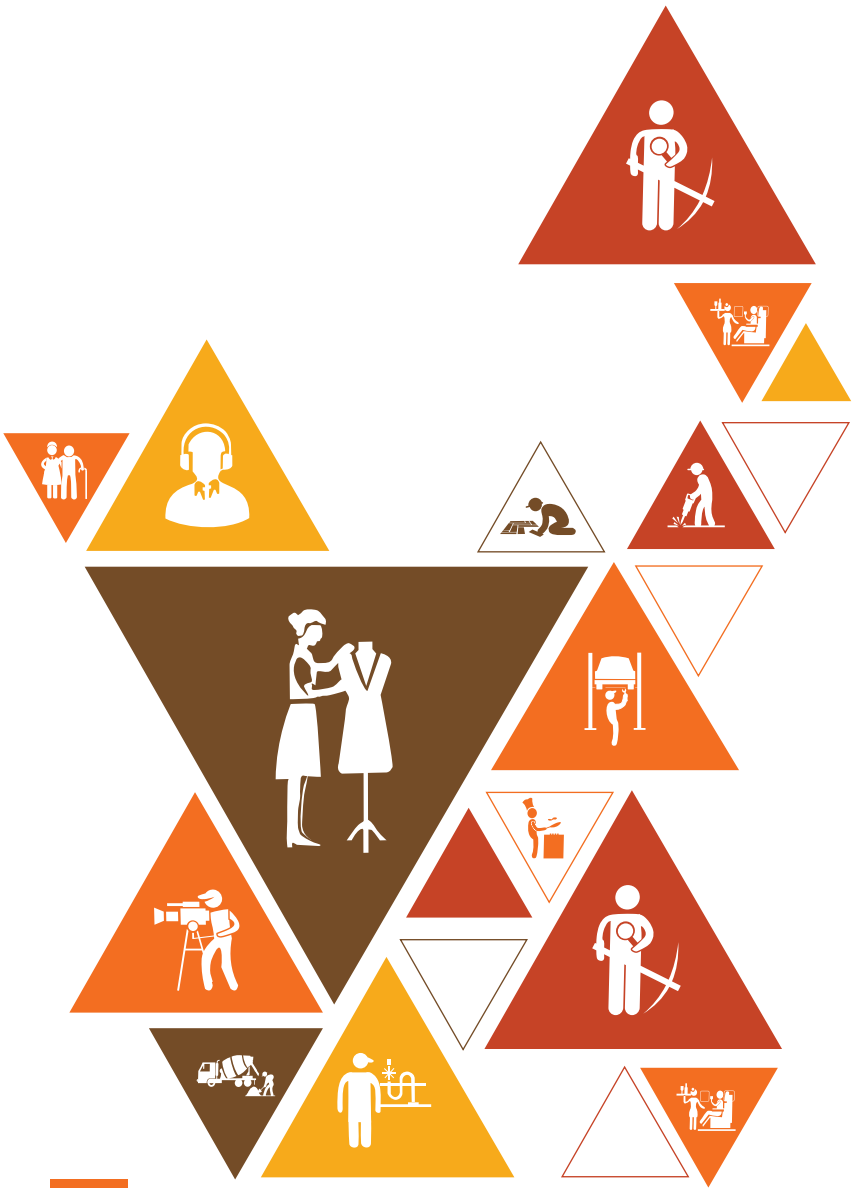
Notes for Facilitation

- Keep the pace lively and maintain a positive atmosphere throughout the session.
- Encourage participants to share their experiences and insights related to troubleshooting broadband services.
- Emphasize the importance of thorough documentation and clear communication when assisting clients with technical issues.
- Remind participants to remain patient and methodical when troubleshooting complex problems.
- Offer additional resources and support for participants who want to further enhance their troubleshooting skills after the session.

Answers to Exercises for PHB

Answer the following questions:

1. Refer UNIT 7.9: Troubleshooting and Repairing of Client's Broadband Service
   Topic: 7.9.1 Common Causes of Broken Internet Connection
2. Refer UNIT 7.9: Troubleshooting and Repairing of Client's Broadband Service
   Topic: 7.9.2 Diagnosing Internet Connection



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Sector
Skill
Council

8. Repairing Handsets

Unit 8.1 - Prepare for Repairing a Handset

Unit 8.2 - Basic Electronics of a Mobile Phone

Unit 8.3 - Resetting a Phone

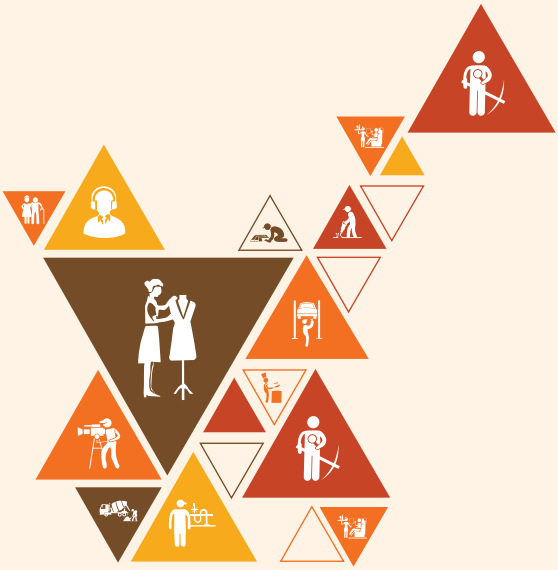
Unit 8.4 - Fixing the Firmware Participant

Unit 8.5 - Hardware Repair Tools

Unit 8.6 - Basic Troubleshooting

Unit 8.7 - Safety Guidelines

Unit 8.8 - Report and Document Daily Activities



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Key Learning Outcomes 

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

1. Repair a handset
2. Outline and explain the basic electronics of a cell phone
3. Outline and explain the various parts and components that makes up a mobile handset
4. Identify and make use of common handset repair tools
5. Disassemble a mobile phone
6. Troubleshoot common handset problems
7. Understand and follow standard safety precautions while repairing a handset
8. List and outline radiation safety laws for mobile handsets in India

Unit 8.1: Prepare for Repairing a Handset

Unit Objectives

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

1. Identify the faulty devices
2. Assist your supervisor in analyzing problems reported by the customer team
3. Understand the importance of adhering to the SLA
4. Identify the costs of repair
5. Understand the formation of alternating and direct current

Resources to be Used

Handset repair tools and equipment, faulty handheld devices for demonstration, service level agreement (SLA) documents, cleaning supplies for the repair area, tablet manufacturer's calibration guidelines, software manuals and reference materials

Say

- Welcome, everyone! Today, we're diving into the world of handset repair preparation."
- Our goal today is to equip you with the knowledge and skills to effectively identify, analyze, and plan handset repair activities.
- Understanding handset repair processes and protocols not only ensures customer satisfaction but also upholds organizational efficiency and professionalism.

Do

- Familiarize participants with the process of identifying faulty handheld devices.
- Discuss the significance of SLAs and how they impact repair prioritization.
- Demonstrate the inspection of repair tables and areas for cleanliness.
- Walk through the equipment calibration process as per the tablet manufacturer's guidelines.
- Provide training on basic software commands and version/module management for data analysis.

Ask

- Can you recall a time when you had to troubleshoot a malfunctioning device in your personal life?
- How do you think having a Service Level Agreement (SLA) in place can benefit both customers and service providers?
- Why do you think it's important to keep detailed records of customer interactions and repair activities?

Elaborate

- Faulty handheld devices and analyze reported issues.
- The importance of SLAs in prioritizing repair activities.
- Areas for cleanliness and adherence to standards.
- The equipment calibration process.
- The significance of recording customer details.
- The formation of alternating and direct current.
- The process of identifying repair costs and assessing Beyond Economic Repair (BER) status.

Demonstrate

Demonstrate the equipment calibration process as per the tablet manufacturer's guidelines.

Activity

1. **Activity name:** Service Level Agreement Simulation
2. **Objective:** To understand the importance of SLAs and practice prioritization based on repair timelines.
3. **Type of Activity:** Group
4. **Resources:** SLA documents, faulty handheld devices, repair tools
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into small groups.
    - Provide each group with simulated repair scenarios and corresponding SLA terms.
    - Instruct groups to prioritize repairs based on SLA guidelines.
    - Facilitate discussion on decision-making processes and outcomes.
7. **Outcome:** Increased understanding of SLA importance and practical application in repair prioritization.

Notes for Facilitation

- Ensure participants actively engage in discussions and hands-on activities.
- Encourage collaboration and problem-solving during group activities.
- Emphasize the real-world relevance of each topic covered.
- Clarify any doubts or questions regarding repair processes and protocols.
- Monitor and provide feedback on participant performance during practical demonstrations.

Unit 8.2: Basic Electronics of a Mobile Phone

Unit Objectives

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

1. Identify and classify various electronic components that are used in mobile handsets

Resources to be Used

Presentation slides on Basic Electronics of a Mobile Phone Printed circuit boards (PCBs) for demonstration Samples of small electronic components like resistors, capacitors, and integrated circuits Visual aids showing circuit symbols A whiteboard or flip chart with markers

Say

- Welcome, everyone! I'm thrilled to dive into the world of Basic Electronics of a Mobile Phone with you today.
- Today, we'll explore the architecture of a mobile handset, understand the components on a printed circuit board, and delve into the functions of various electronic parts.
- Understanding basic electronics is crucial in today's world, especially with the prevalence of mobile technology. It empowers us to troubleshoot common issues and appreciate the marvels of modern communication.

Do

- Begin with an overview of the architecture of a mobile handset.
- Demonstrate the layout and key components of a printed circuit board (PCB).
- Introduce different card-level parts and their functions.
- Explain the roles of big and small electronic parts within a mobile phone.
- Teach about electric circuits, types of circuits, and their applications.
- Show examples of SMD resistors, capacitors, and integrated circuits (ICs).
- Discuss the importance and function of filters in mobile phones.
- Guide participants in identifying common circuit symbols.
- Explain electric power, grounding, and their significance in mobile phone operation.
- Cover diodes, transistors (PNP and NPN), and their functions.

Ask

- What components of a mobile phone do you interact with daily?
- Can you think of any real-life examples where understanding basic electronics could be useful?
- How do you think the design of a mobile phone impacts its functionality?

Elaborate

- The Architecture of a Mobile Handset
- The Components of a Printed Circuit Board (PCB)
- Card-Level Parts and their Functions
- Big and Small Parts of a Mobile Phone and their Functions
- Electric Circuits and Different Circuit Types
- Surface Mounted Devices (SMD) like Resistors and Capacitors
- Integrated Circuits (ICs) and their Importance
- Filters in Mobile Phone Circuits
- Interpret Circuit Symbols
- Electric Power, Earthing, and Safety Measures
- About Diodes, Transistors, and their Roles in Mobile Electronics

Demonstrate

Demonstrate the soldering of a Surface Mounted Device (SMD) resistor onto a PCB to show how components are assembled in modern electronics.

Activity

1. **Activity name:** Circuit Symbol Identification
2. **Objective:** To reinforce understanding of circuit symbols and their meanings.
3. **Type of Activity:** Group
4. **Resources:** Visual aids with circuit symbols, whiteboard or flip chart
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into groups of 3-4.
   - Provide each group with a set of circuit symbols.
   - Ask them to identify and explain the function of each symbol.
   - Encourage discussion and collaboration within groups.
   - After 15 minutes, reconvene and review the answers together.
7. **Outcome:** Participants will gain confidence in identifying common circuit symbols used in mobile electronics.

Notes for Facilitation

- Provide opportunities for hands-on exploration with actual electronic components.
- Encourage active participation and questions throughout the session.
- Emphasize safety precautions when handling electronic devices and components.
- Highlight the relevance of each topic to real-life scenarios and practical applications.
- Use analogies and visual aids to simplify complex concepts for better understanding.
- Ensure a balance between theory and practical demonstrations to cater to different learning styles.

Unit 8.3: Resetting a Phone

Unit Objectives

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

1. Recall and demonstrate steps to reset a phone to its original factory settings
2. Recall and demonstrate steps to download apps and set-up email accounts on a handset

Resources to be Used

Mobile phones (one for demonstration purposes) presentation slides or whiteboard and markers relevant apps for demonstration (e.g., app store, email client) printed instructions for resetting a phone and setting up emails access to a wi-fi network for practical demonstrations

Say

- Welcome, everyone! I'm thrilled to have you all here today to learn about resetting mobile phones.
- Today, we're going to delve into the importance of resetting a phone, the steps involved, and how to perform tasks like installing apps and setting up emails.
- Understanding these processes can enhance your mobile experience, ensuring smooth operation and troubleshooting when needed.

Do

- Begin the session with an overview of the importance of resetting phones and the potential benefits.
- Demonstrate the steps involved in resetting a phone, emphasizing safety precautions and data backup.
- Walk through the process of installing apps from an app store, highlighting different methods and considerations.
- Provide guidance on setting up emails on a mobile device, including configuring settings and troubleshooting common issues.

Ask

- How often do you encounter issues with your mobile phone that might require a reset?
- Can you share any experiences where you had to reinstall apps on your phone?
- Have you ever faced challenges setting up emails on your mobile device?

Elaborate

- The importance of resetting a phone periodically to optimize performance.
- The steps involved in resetting a phone, from accessing settings to confirming the reset.
- The process of installing apps, including searching, selecting, and downloading from the app store.
- The significance of setting up emails on a mobile device for communication and productivity.

Demonstrate

Demonstrate the process of resetting a phone using a sample device, highlighting each step and explaining the reasons behind them.

Activity

1. **Activity name:** App Installation Challenge
2. **Objective:** To practice installing apps from the app store and exploring different categories.
3. **Type of Activity:** Individual
4. **Resources:** Mobile devices with app stores, list of suggested apps
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Begin by explaining the objective of the activity - participants will choose and install apps based on their interests.
    - Distribute the list of suggested apps to guide participants or encourage them to explore freely.
    - Instruct participants to navigate to the app store on their devices and initiate the installation process for the selected apps.
    - Encourage participants to explore different app categories during the process.
    - Remind them to pay attention to any prompts, permissions, or additional settings required during installation.
    - After the installation, ask participants to briefly share their experiences, discussing any challenges or interesting observations.
7. **Outcome:** Participants will gain practical experience in installing apps, explore various categories, and engage in a brief discussion to share their insights.

Notes for Facilitation

- Ensure participants understand the importance of backing up data before resetting their phones.
- Encourage active participation and questions throughout the session to enhance understanding.
- Remind participants to follow security best practices when setting up emails, such as enabling two-factor authentication.
- Emphasize the importance of keeping apps and operating systems updated for optimal performance.
- Provide additional resources or support for participants who may need further assistance with resetting phones or setting up emails.

Unit 8.4: Fixing the Firmware Participant

Unit Objectives

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

1. Outline and explain the role of firmware in a handset
2. Recall and demonstrate steps to install a new firmware

Resources to be Used

PowerPoint slides Whiteboard and markers mobile phones (one for demonstration purposes) usb cables for mobile phones computer with flashing software installed handouts or reference materials on firmware flashing process

Say

- Hello everyone! Welcome to today's session on understanding firmware and how to fix it.
- Today, we're going to learn about firmware, specifically focusing on how to flash a mobile phone. By the end of this session, you'll understand the importance of firmware and gain practical knowledge on how to perform this crucial task.
- Understanding firmware and how to fix it is essential in today's digital world. With the rapid advancements in technology, knowing how to troubleshoot firmware issues can be invaluable, both personally and professionally. Whether it's to revive a malfunctioning device or to optimize its performance, this knowledge will empower you to take control of your devices.

Do

- Begin by introducing the topic of firmware and its significance in electronic devices.
- Explain the process of flashing a mobile phone, including the preparation steps and the actual flashing procedure.
- Demonstrate flashing a mobile phone using a computer and appropriate software.
- Provide hands-on practice opportunities for participants to flash a mobile phone under your supervision.

Ask

- Have you ever experienced a situation where your mobile phone malfunctioned due to firmware issues?
- Can you think of any real-life examples where knowing how to fix firmware could be beneficial?
- How often do you update the firmware on your devices, and why do you think it's important?

Elaborate

- The components of firmware
- The role of firmware in electronic devices
- The common firmware issues faced by users
- The steps involved in flashing firmware
- The importance of firmware updates for device performance
- Safety precautions to be followed during the flashing process

Demonstrate

Connect a mobile phone to a computer and demonstrate the flashing process using flashing software.

Activity

1. **Activity name:** Flashing Practice
2. **Objective:** To reinforce understanding of the firmware flashing process.
3. **Type of Activity:** Group
4. **Resources:** Mobile phones, USB cables, computer with flashing software
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Divide the participants into groups of two.
    - Provide each group with the following resources:
        - One mobile phone
        - One USB cable
    - Access to a computer with flashing software installed.
    - Guide the groups through the flashing process step by step.
    - Ensure that participants follow safety precautions while handling electronic devices and computer equipment.
    - Encourage collaboration and problem-solving among group members during the activity.
    - Offer assistance and support to groups as needed, ensuring that they can successfully complete the flashing process.
    - Monitor the progress of each group and provide additional guidance or clarification as required.
    - After the activity, facilitate a discussion to review the flashing process and address any questions or concerns raised by the participants.
    - Ensure that all equipment is properly cleaned up and returned to its designated place after the activity.
    - Provide feedback to the participants on their performance and offer suggestions for improvement where necessary.
7. **Outcome:** Participants will gain hands-on experience in flashing firmware, increasing their confidence in performing this task independently.

Notes for Facilitation

- Always ensure the safety of participants when working with electronic devices and computer equipment.
- Encourage active participation and questions throughout the session to facilitate a deeper understanding of the topic.
- Provide additional resources or support for participants who may require further assistance with the flashing process.
- Emphasize the importance of backing up data before performing any firmware modifications.
- Remind participants to refer to manufacturer guidelines and software documentation for specific instructions related to their devices.

Unit 8.5: Hardware Repair Tools

Unit Objectives

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

1. Identify and make use of common mobile handsets repair tool

Resources to be Used

Soldering Iron Lead-free soldering tools Access, cutting, and cleaning tools Multimeter Handheld devices (handset & tablet) for demonstration purposes

Say

- Welcome everyone! Today, we're diving into the world of hardware repair tools, a fundamental aspect of any technician's skill set.
- Our goal today is to familiarize ourselves with common hardware repair tools, understand their applications, and grasp the concepts behind techniques like soldering and chip-off procedures.
- Understanding hardware repair tools not only enhances your troubleshooting skills but also empowers you to tackle a wide range of hardware issues confidently, whether it's repairing a smartphone or troubleshooting a computer.

Do

- Begin by introducing each tool individually, explaining its purpose and demonstrating how it's used.
- Provide hands-on practice with soldering techniques using lead-free soldering tools.
- Show how to use a multimeter for testing electrical components.
- Demonstrate basic concepts of chip-off procedures and re-balling techniques for embedded multimedia chips.

Ask

- How many of you have encountered a situation where a device stopped working due to a hardware issue?
- Can you think of any real-life examples where understanding hardware repair tools could be beneficial?
- What are some common daily tasks where you think knowledge of soldering might come in handy?

Elaborate

- The components of a soldering iron.
- The process of soldering and its importance in electronics repair.
- The significance of lead-free soldering in modern electronics.
- The functions of access, cutting, and cleaning tools in hardware repair.
- The basics of using a multimeter for troubleshooting electrical issues.
- The procedure of chip-off, re-balling, and soldering for handheld devices.

Demonstrate

Show how to solder a loose wire onto a circuit board using a soldering iron.

Activity

1. **Activity name:** Soldering Practice Session
2. **Objective:** To familiarize participants with soldering techniques and tools.
3. **Type of Activity:** Individual
4. **Resources:** Soldering iron, lead-free solder, circuit boards, wires
5. **Time Duration:** 20-30 minutes
6. **Instructions**
    - Set up soldering stations with soldering irons, lead-free solder, circuit boards, and wires.
    - Demonstrate proper soldering techniques to participants, including how to heat the soldering iron, apply solder, and create secure connections.
    - Supervise participants as they practice soldering wires onto circuit boards.
    - Provide individualized guidance and feedback to ensure participants grasp the techniques effectively.
    - Emphasize safety precautions, such as wearing safety glasses and avoiding touching the hot soldering iron tip.
    - Encourage participants to ask questions and seek assistance if they encounter any difficulties.
    - Monitor the practice session to ensure everyone is following proper procedures and handling the equipment safely.
7. **Outcome:** Participants gain hands-on experience and confidence in using soldering tools.

Notes for Facilitation

- Encourage active participation and questions throughout the session.
- Provide feedback and guidance during hands-on activities to ensure safety and effective learning.
- Emphasize the importance of precision and attention to detail, especially during soldering and chip-off procedures.
- Remind participants to handle tools and equipment with care to avoid accidents or damage.
- Allocate time for review and clarification of concepts before concluding the session.

Unit 8.6: Basic Troubleshooting

Unit Objectives

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

1. Open up or disassemble a mobile phone using the common hardware repair tools
2. Identify and troubleshoot common handset problems
3. Identify and troubleshoot common software related issues in phones
4. Create back up data from the handset

Resources to be Used

A functioning mobile phone for demonstration purposes, screwdrivers and other necessary tools for disassembling a mobile phone, visual aids such as diagrams or videos to illustrate the disassembling process, spare parts or dummy components to demonstrate repair procedures, safety equipment like gloves and safety glasses.

Say

- Hello everyone! Welcome to today's session on basic troubleshooting for mobile phones.
- Today, we're going to learn how to troubleshoot common issues with mobile phones, from battery problems to display malfunctions.
- Understanding basic troubleshooting techniques can save you time and money by empowering you to solve common mobile phone issues on your own. Plus, it's a valuable skill to have in today's digital age!

Do

- Begin the session with a brief overview of the topics to be covered.
- Demonstrate the disassembling process of a mobile phone, highlighting key components and safety precautions.
- Provide step-by-step instructions for troubleshooting various issues, including battery problems, network issues, overheating, and more.
- Encourage participants to ask questions and participate in hands-on activities.
- Offer guidance and support as participants practice troubleshooting techniques.
- Summarize key takeaways and address any remaining questions or concerns.

Ask

- What was the last mobile phone issue you encountered, and how did you resolve it?
- Can you think of a situation where a mobile phone problem caused inconvenience or disruption in your daily life?
- Have you ever attempted to fix a mobile phone issue yourself, or do you usually seek professional help?

Elaborate

- Battery-related problems and implement solutions.
- Network connectivity issues and troubleshoot signal problems.
- Overheating concerns and implement cooling solutions.
- Earpiece, ringer, vibrator, microphone, display, LED, touchscreen, keypad, and SIM card problems.
- Smartphone software and transfer mobile data seamlessly.

Demonstrate

Demonstrate the disassembling process of a mobile phone, showcasing how to safely remove the back cover, battery, and other components.

Activity

1. **Activity name:** Troubleshooting Challenge
2. **Objective:** To practice troubleshooting skills for various mobile phone issues.
3. **Type of Activity:** Group
4. **Resources:** Several malfunctioning mobile phones, tools for disassembly, spare parts.
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into groups.
    - Assign each group a different mobile phone issue to troubleshoot.
    - Provide necessary tools and resources for disassembling the phones.
    - Encourage collaboration among group members.
    - Task groups with identifying the root cause of the assigned problem.
    - Foster problem-solving skills within each group.
    - Ensure each group has adequate support and guidance during the activity.
7. **Outcome:** Participants will gain practical experience in troubleshooting mobile phone issues and develop problem-solving skills.

Notes for Facilitation

- Always prioritize safety during hands-on activities, especially when handling electronic devices.
- Encourage active participation and foster a supportive learning environment.
- Remind participants to document their troubleshooting process for future reference.
- Emphasize the importance of understanding the limitations of DIY troubleshooting and knowing when to seek professional assistance.
- Provide additional resources or references for participants interested in further exploring mobile phone repair and troubleshooting techniques.

Unit 8.7: Safety Guidelines

Unit Objectives

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

1. Understand and follow standard safety precautions while repairing a handset
2. Understand and follow radiation compliance standards for mobile phones in India

Resources to be Used

Presentation slides Handouts on radiation compliance for mobile handsets Whiteboard and markers Mobile handsets for demonstration

Say

- Welcome, everyone! I'm thrilled to have you here today to dive into our session on Safety Guidelines.
- Today, we're going to explore safety tips and precautions, with a particular focus on radiation compliance for mobile handsets.
- Understanding safety guidelines is crucial in ensuring our well-being, both in our personal and professional lives. It's essential to grasp the importance of these guidelines to protect ourselves and those around us.

Do

- Start the session with an overview of safety guidelines and their significance.
- Introduce the specific topic of radiation compliance for mobile handsets.
- Engage participants in discussions and activities to reinforce learning and understanding.

Ask

- What are some safety precautions you take in your daily life, especially regarding technology usage?
- Can you think of any instances where adherence to safety guidelines could have prevented an accident or injury?
- How often do you consider the potential health impacts of using mobile devices?

Elaborate

- Common safety hazards (e.g., electrical, chemical, ergonomic) and discuss preventive measures.
- The principles of radiation compliance and its implications for mobile handset users.
- Safety protocols for handling mobile devices in various environments.

Demonstrate

Demonstrate proper techniques for holding and using mobile handsets to minimize radiation exposure.

Activity

1. **Activity name:** Radiation Risk Simulation
2. **Objective:** To understand the concept of radiation compliance and its relevance to mobile handset usage.
3. **Type of Activity:** Group
4. **Resources:** Radiation meters, mobile handsets
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into groups of 3-4.
   - Provide each group with a radiation meter and a mobile handset.
   - Instruct them to measure and compare the radiation levels emitted by different handsets.
   - Facilitate a discussion on the findings and implications for user safety.
7. **Outcome:** Participants gain practical insights into radiation exposure risks and the importance of compliance with safety standards.

Notes for Facilitation

- Maintain an interactive and engaging atmosphere throughout the session.
- Encourage active participation and open dialogue among participants.
- Provide real-life examples to illustrate the importance of safety guidelines.
- Emphasize the responsibility of individuals in adhering to safety protocols.
- Offer additional resources for further reading or training on safety best practices.

Unit 8.8: Report and Document Daily Activities

Unit Objectives

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

1. Identify and fill up a job-card, a daily activity report, and a customer feedback form

Resources to be Used

Presentation slides Whiteboard and markers Handouts of sample repair job-cards, daily activity reports, and customer feedback forms Pens and paper for participants

Say

- Welcome, everyone! I'm thrilled to have you here today to dive into the world of reporting and documenting daily activities. This session promises to equip you with essential skills for effective record-keeping.
- Today, we'll explore the significance of accurate reporting in our daily work, understand the components of key documents like repair job-cards and daily activity reports, and appreciate the importance of gathering customer feedback.
- Understanding how to report and document daily activities is crucial for maintaining transparency, accountability, and efficiency in our work. It enables us to track progress, identify areas for improvement, and ultimately deliver better service to our customers.

Do

- Start the session with a brief icebreaker to create a positive atmosphere.
- Present key concepts using slides and engage participants through interactive discussions.
- Distribute handouts of sample documents and encourage participants to analyze them in small groups.
- Facilitate a role-playing activity where participants simulate filling out repair job-cards or daily activity reports.
- Conclude with a recap of the main points discussed and open the floor for questions.

Ask

- What types of daily activities do you engage in at work?
- Can you share an experience where accurate reporting or documentation was crucial in your past roles?
- How do you think customer feedback can contribute to improving our services?

Elaborate

- The importance of accurate reporting.
- The components of a repair job-card and daily activity report.
- The significance of gathering and documenting customer feedback.

Demonstrate

Demonstrating how to fill out a repair job-card, emphasizing the importance of including detailed information such as work performed, materials used, and time spent.

Activity

1. **Activity name:** Documenting Daily Activities Workshop
2. **Objective:** To practice filling out repair job-cards and daily activity reports accurately.
3. **Type of Activity:** Group
4. **Resources:** Sample repair job-cards, daily activity reports, pens, and paper.
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Distribute sample documents and assign each group a scenario to work on.
   - Participants collaborate to fill out the documents based on the given scenario.
   - After completion, groups present their documents, highlighting key details and discussing any challenges faced.
7. **Outcome:** Improved understanding of document requirements and enhanced skills in accurate reporting.

Notes for Facilitation

- Encourage active participation and create a supportive learning environment.
- Keep the session interactive by incorporating group discussions and activities.
- Emphasize the importance of accuracy and completeness in documentation.
- Highlight the role of clear communication in conveying information effectively.
- Encourage participants to ask questions and seek clarification throughout the session.

Answers to Exercises for PHB

Multiple Choice Questions:

1. a. SIM Card
2. d. All of the above
3. a. Memory card
4. c. Both a & b
5. d. All of the above
6. b. Resistor can be open
7. c. Blocked circuit
8. a. PCB or logic-board
9. c. Desoldering
10. d. All of the above
11. d. All of the above
12. d. Both b & c
13. c. Take a back-up of the data (mandatory) to avoid losing it
14. d. All of the above
15. d. All of the above
16. a. Flashing
17. d. Both b & c
18. d. All of the above
19. a. *#7370# followed by 12345
20. b. *#7370# followed by 12345
21. d. Both a & b
22. a. A formal accounting of the procedures and transactions

Descriptive Questions:

1. Refer UNIT 8.2: Basic Electronics of a Mobile Phone
   8.2.2 The Printed Circuit Board or PCB
2. Refer UNIT 8.2: Basic Electronics of a Mobile Phone
   Topic 8.2.1 Architecture of a Mobile Handset
3. Refer UNIT 8.5: Hardware Repair Tools
   Topic 8.5.2 Soldering Iron
4. Refer UNIT 8.6: Basic Troubleshooting
   Topic 8.6.7 Steps: Solution to Ringer Problem
5. Refer UNIT 8.2: Basic Electronics of a Mobile Phone
   Topic 8.2.2 The Printed Circuit Board or PCB

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सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Telecom
Sector
Skill
Council

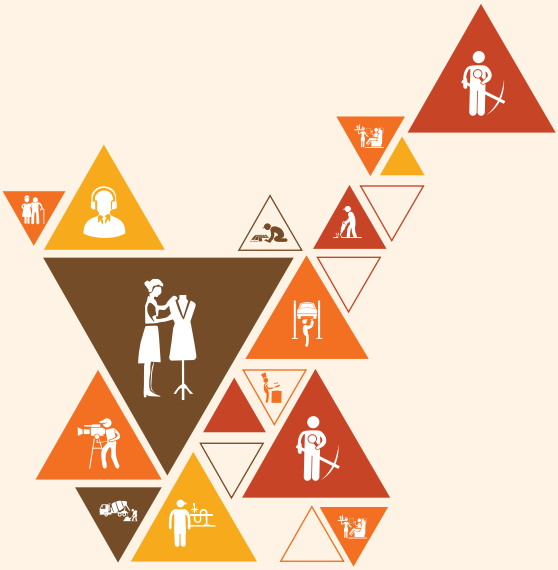
9. Grameen Udhyami Initiative and Entrepreneurial Activities

Unit 9.1 - Business Planning and Infrastructure Setup

Unit 9.2 - Digital Literacy and Service Offerings

Unit 9.3 - Introduction to UPS Installation and Maintenance

Unit 9.4 - Technology Setup and Consultation



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Key Learning Outcomes

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

1. Assess the specific technology needs of a village to create tailored telecom and hardware solutions.
2. Develop a comprehensive business plan, encompassing services, target markets, finances, and marketing strategies for a techpreneurial business.
3. Identify suitable locations and define necessary infrastructure requirements for establishing a techpreneurial business.
4. Explain the process of obtaining permits and licenses necessary to operate a technology business in the village.
5. Define the purpose and benefits of organizing workshops to promote digital literacy in the community.
6. List services related to comprehensive telecom solutions, such as SIM card sales, mobile recharge, top-up, and post-paid bill payment.
7. Explain the concept of internet connectivity solutions, including broadband and wireless connections for both residential and business use.
8. Elaborate on setting up public Wi-Fi hotspots in central locations, focusing on proper installation and network security.
9. Describe the importance of expert hardware and software repair and troubleshooting services for various devices.
10. Identify strategies for collaborating with government officials and NGOs to establish a village information center with computer setups and internet connectivity.
11. Explain how to coordinate with healthcare providers to set up and manage telemedicine centers, ensuring proper equipment and connectivity.
12. Discuss installing and maintaining security measures like CCTV cameras, emphasizing proper functioning and coverage.
13. Demonstrate the correct procedures for installing and configuring internet connectivity solutions for residential and business users, such as broadband or wireless connections.
14. Illustrate the process of setting up and providing support for local area networks (LANs) in offices and homes, enabling file sharing and communication.
15. Provide guidance and consultation services to individuals and businesses on technology-related matters, addressing their specific needs and helping them make informed decisions.

Unit 9.1: Business Planning and Infrastructure Setup

Unit Objectives

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

1. Analyze the specific needs and demands for telecom and hardware solutions in a village
2. Develop a comprehensive business plan, including services, target market, finances, and marketing strategies
3. Identify the suitable location and describe the necessary infrastructure required to set up a techpreneurial business
4. Explain the process of obtaining necessary permits and licenses for the business

Resources to be Used

PowerPoint slides on business planning and infrastructure setup Handouts with key concepts and templates for business planning Case studies or success stories of businesses in rural areas Internet access for real-time examples and research

Say

- Hello everyone! Welcome to today's session on Business Planning and Infrastructure Setup.
- Today, we'll explore the fundamentals of business planning, identifying suitable locations, obtaining necessary permits, and more. By the end of the session, you'll have a clear understanding of how to set up a successful business in rural areas.
- Understanding business planning and infrastructure setup is crucial for anyone looking to start a business in rural communities. It lays the foundation for success and ensures that your venture is well-prepared to thrive in its environment.

Do

- Begin by introducing key concepts and providing examples to illustrate each point.
- Encourage participation and discussion throughout the session.
- Use case studies or success stories to demonstrate real-world applications.
- Provide time for questions and clarification.
- Utilize group activities to reinforce learning and encourage collaboration.
- Conclude with a summary of the key takeaways and next steps.

Ask

- How do you think the infrastructure needs of rural areas differ from urban areas?
- Can you think of any examples of businesses that have successfully operated in rural communities?
- What challenges do you anticipate when it comes to obtaining permits and licenses for a business in a rural area?

Elaborate

- The suitable locations for your business.
- About comprehensive business plan.
- The process of obtaining necessary permits and licenses.
- Infrastructure essentials for your business.
- Rural tech needs and innovative solutions.
- Telecom and hardware solutions for rural communities.

Demonstrate

Develop a sample business plan using a template or software program.

Activity

1. **Activity name:** Business Plan Simulation
2. **Objective:** To create a basic business plan for a hypothetical venture in a rural area.
3. **Type of Activity:** Group
4. **Resources:** Handouts with business plan templates, internet access
5. **Time Duration:** 25 minutes
6. **Instructions**
    - Divide participants into small groups.
    - Provide each group with a business plan template.
    - Assign each group a different type of business (e.g., agriculture, retail, tourism).
    - Instruct the groups to fill out the template with relevant information.
    - Encourage them to include details such as target market, marketing strategies, financial projections, etc.
    - Emphasize creativity and collaboration among group members.
7. **Outcome:** Each group will present their business plan to the rest of the class, highlighting key strategies and decisions.

Notes for Facilitation

- Keep the session interactive and engaging by encouraging questions and discussion.
- Provide real-world examples and case studies to illustrate key concepts.
- Emphasize the importance of thorough planning and research when setting up a business in rural areas.
- Discuss specific challenges and opportunities related to infrastructure development and technology adoption in rural communities.
- Encourage participants to think critically and creatively about potential solutions to rural business challenges.

Unit 9.2: Digital Literacy and Service Offerings

Unit Objectives

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

1. Define the purpose and benefits of organizing workshops to promote digital literacy in the village.
2. List the services involved in comprehensive telecom solutions, including SIM card sales, mobile recharge, top-up, and post-paid bill payment.
3. Explain the concept of internet connectivity solutions, such as broadband or wireless connections, for homes and businesses.
4. Elaborate the procedure to set up public Wi-Fi hotspots in central locations, ensuring proper installation and network security.
5. Describe the importance of expert hardware and software repair and troubleshooting services for various devices.
6. Identify ways to collaborate with government officials and NGOs to set up a village information center, including computer set-up and internet connectivity.

Resources to be Used

Presentation slides on digital literacy and service offerings Handouts detailing connectivity solutions and hardware/software repair services Access to a computer with internet connection for demonstrations Whiteboard and markers for brainstorming sessions

Say

- Hello everyone! Welcome to our workshop on promoting digital literacy in our village. I'm thrilled to see all of you here today!
- Our objective today is to explore the importance of digital literacy and the various services available to improve connectivity and access to technology in our community.
- Understanding digital literacy and available services is crucial for staying connected, accessing information, and enhancing opportunities for personal and community development.

Do

- Begin with an icebreaker activity to introduce participants and create a comfortable environment.
- Present key concepts and information using multimedia resources and real-life examples.
- Facilitate group discussions and brainstorming sessions to encourage active participation.
- Conduct hands-on demonstrations of setting up public Wi-Fi hotspots and basic hardware/software repair techniques.
- Assign group activities or projects to apply the knowledge gained during the workshop.
- Conclude with a recap of key takeaways and next steps for promoting digital literacy in the community.

Ask

- How often do you use the internet in your daily life?
- Can you think of any situations where having access to public Wi-Fi would be beneficial in our village?
- Have you ever experienced difficulties with your electronic devices that required repair?

Elaborate

- The importance of digital literacy in community development.
- The various connectivity solutions available, including public Wi-Fi hotspots.
- The significance of hardware and software repair services for maintaining technology access.
- The collaboration opportunities with government officials and NGOs to support digital initiatives.

Demonstrate

Demonstrate how to set up a public Wi-Fi hotspot in a central location using a router and internet connection.

Activity

1. **Activity name:** Digital Literacy Challenge
2. **Objective:** To reinforce understanding of digital literacy concepts and services.
3. **Type of Activity:** Group
4. **Resources:** Handouts on digital literacy and connectivity solutions, whiteboard and markers.
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into small groups.
   - Provide scenarios related to digital literacy challenges in the community.
   - Ask each group to discuss and come up with solutions.
   - Have groups present their solutions and facilitate a group discussion.
7. **Outcome:** Increased awareness of digital literacy issues and brainstormed solutions for community improvement.

Notes for Facilitation

- Encourage active participation and respect for diverse perspectives.
- Maintain a supportive and inclusive atmosphere throughout the workshop.
- Highlight the practical benefits of digital literacy and service offerings for community development.
- Emphasize the importance of collaboration and community engagement in implementing digital initiatives.
- Provide opportunities for ongoing learning and skill-building beyond the workshop.

Unit 9.3: Introduction to UPS Installation and Maintenance

Unit Objectives

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

1. Identify various types of UPS and batteries used in them.
2. Perform measurements and analysis of voltage, current, and earthing to ensure correct UPS installation.
3. Demonstrate the process to route the power supply through the UPS and handle power supplies with necessary precautions.
4. Explain the consequences of not maintaining the UPS regularly

Resources to be Used

Presentation slides on UPS installation and maintenance UPS units for demonstration Various types of batteries used in UPS Voltage, current, and earthing analysis tools Power supply routing diagrams Safety equipment for handling power supplies

Say

- Hello everyone, and welcome to today's session on UPS installation and maintenance! I'm excited to dive into this topic with all of you.
- Today, we're going to explore the fundamentals of UPS installation and maintenance, understanding the types of batteries used, analyzing voltage, current, and earthing in UPS systems, and learning how to safely route power through UPS units.
- Understanding UPS installation and maintenance is crucial in ensuring reliable power backup solutions for various applications, from home offices to industrial setups. It empowers us to mitigate risks and maintain uninterrupted power supply, enhancing productivity and equipment longevity.

Do

- Begin the session by providing an overview of UPS systems and their importance.
- Demonstrate the different types of batteries used in UPS units and explain their characteristics.
- Conduct practical exercises on voltage, current, and earthing analysis in UPS setups.
- Guide participants on routing power supply through UPS units effectively.
- Emphasize safety precautions and best practices for handling power supplies throughout the session.

Ask

- What are some situations in your daily life where a power outage could cause inconvenience or disruption?
- Can you think of any real-life examples where having an uninterruptible power supply would have been beneficial?
- Have you ever encountered issues with voltage fluctuations or power surges? How did you address them?

Elaborate

- Types of batteries used in UPS systems and their properties.
- Voltage, current, and earthing configurations in UPS installations.
- Power supply through UPS units for optimal performance.
- Power supplies with necessary precautions to ensure safety and reliability.

Demonstrate

Demonstrate how to properly connect and disconnect a UPS unit from a power source while emphasizing safety measures.

Activity

1. **Activity name:** UPS Installation Simulation
2. **Objective:** To reinforce understanding of UPS installation procedures and safety precautions.
3. **Type of Activity:** Group
4. **Resources:** UPS units, power cables, installation guides
5. **Time Duration:** 25 minutes
6. **Instructions**
   - Divide participants into groups.
   - Provide each group with a UPS unit and installation materials.
   - Instruct the groups to simulate the installation process.
   - Ensure proper connection and adherence to safety guidelines during the simulation.
   - Encourage discussion and collaboration within the groups to facilitate learning and problem-solving.
7. **Outcome:** Improved understanding of UPS installation procedures and awareness of safety measures.

Notes for Facilitation

- Provide ample opportunities for hands-on practice and interaction throughout the session.
- Encourage questions and discussions to enhance engagement and learning.
- Remind participants to follow safety protocols at all times when handling power supplies.
- Highlight the importance of regular maintenance and monitoring for optimal UPS performance.
- Share relevant case studies or success stories to illustrate real-world applications and benefits.

Unit 9.4: Technology Setup and Consultation

Unit Objectives

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

1. Explain how to coordinate with healthcare providers to set up and manage telemedicine centers, ensuring proper equipment and connectivity
2. Discuss how to assist in installing and maintaining security measures like CCTV cameras, ensuring proper functioning and coverage.
3. Demonstrate the correct procedure to install and configure internet connectivity solutions in homes and businesses, such as broadband or wireless connections.
4. Show how to configure and establish local area networks (LANs) in offices and homes, enabling file sharing and communication.
5. Show how to install and provide support for software applications, remove viruses and malware, and perform data backup and recovery.
6. Provide personalized advice and consultation services to individuals and businesses on technology related matters, addressing their specific needs.
7. Explain the role of technology advice and consultation services in helping individuals and businesses make informed decisions.
8. Outline the importance of providing technology-related advice and consultation to individuals and businesses.

Resources to be Used

Presentation slides Handouts with key points and diagrams Whiteboard and markers Laptops or tablets for demonstrations

Say

- Hello everyone! Welcome to our session on Technology Setup and Consultation. Today, we'll dive into crucial aspects of setting up and managing various technological infrastructures to enhance efficiency and security.
- Our objective today is to understand the fundamentals of technology setup and consultation, including installing security measures, establishing internet connectivity solutions, and ensuring system reliability.
- Understanding technology setup and consultation is essential in today's digital age. Whether at home or in business, knowing how to set up and manage technology infrastructure ensures smooth operations and data security.

Do

- Ways to set up CCTV systems to monitor and enhance security.
- How to configure LAN networks to enable seamless communication and resource sharing.
- Ways to implement measures to ensure system uptime and protect sensitive data.
- Steps to provide Personalized Advice and Consultation Services

Ask

- How do you currently ensure security in your home or workplace?
- Have you ever faced challenges with internet connectivity? How did you resolve them?
- Can you think of a situation where a local area network (LAN) would be beneficial?

Elaborate

- Types of batteries used in UPS systems and their properties.
- Voltage, current, and earthing configurations in UPS installations.
- Power supply through UPS units for optimal performance.
- Power supplies with necessary precautions to ensure safety and reliability.

Demonstrate

Demonstrate how to install a CCTV camera system, including mounting cameras, connecting cables, and configuring settings.

Activity

1. **Activity name:** Network Setup Challenge
2. **Objective:** To simulate real-world scenarios and troubleshoot network connectivity issues.
3. **Type of Activity:** Group
4. **Resources:** Laptops, routers, Ethernet cables
5. **Time Duration:** 30 minutes
6. **Instructions**
    - Divide participants into teams.
    - Present each team with a simulated network setup scenario.
    - Instruct teams to identify and resolve connectivity issues.
    - Set a time frame for completion.
    - Monitor teams' progress and provide guidance if needed.
    - Encourage collaboration and problem-solving among team members.
    - Review solutions and discuss lessons learned as a group.
7. **Outcome:** Improved problem-solving skills and better understanding of network setup challenges.

Notes for Facilitation

- Use active listening and encourage participation from all participants.
- Keep the pace of the session dynamic to maintain engagement.
- Provide additional resources and references for further learning.
- Highlight the importance of data privacy and security in all discussions.
- Emphasize the role of technology in enhancing productivity and efficiency in both personal and professional settings.

Answers to Exercises for PHB

Multiple Choice Questions:

1. c. To enhance the village's technological infrastructure
2. c. Grocery delivery
3. c. To provide free internet access to the community
4. b. To prevent data loss during power outages
5. d. To help make informed technology-related decisions

Descriptive Questions:

1. Refer UNIT 9.1: Business Planning and Infrastructure Setup
   Topic: 9.1.1 Rural Tech Needs Assessment and Solutions Analysis
2. Refer UNIT 9.1: Business Planning and Infrastructure Setup
   Topic: 9.1.3 Developing a Comprehensive Business Plan
3. Refer UNIT 9.1: Business Planning and Infrastructure Setup
   Topic: 9.1.4 Identifying Suitable Locations and Infrastructure Essentials
4. Refer UNIT 9.1: Business Planning and Infrastructure Setup
   Topic: 9.1.5 Process of Obtaining Necessary Permits and Licenses for the Business
5. UNIT 9.2: Digital Literacy and Service Offerings
   9.2.1 Organizing Workshops to Promote Digital Literacy in the Village

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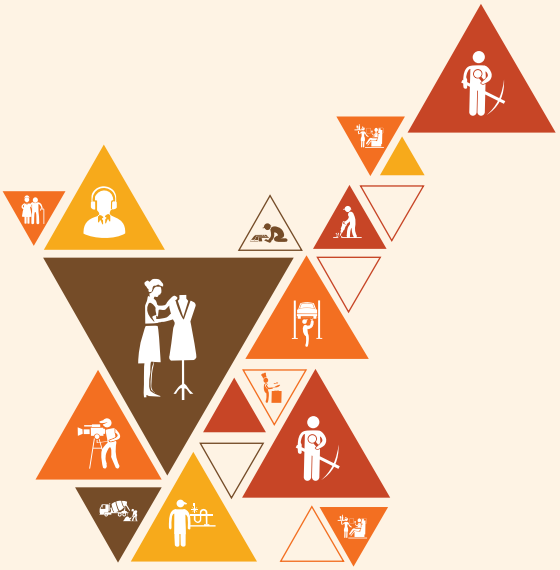
10. Employability Skills



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Scan the QR codes or click on the link for the e-books

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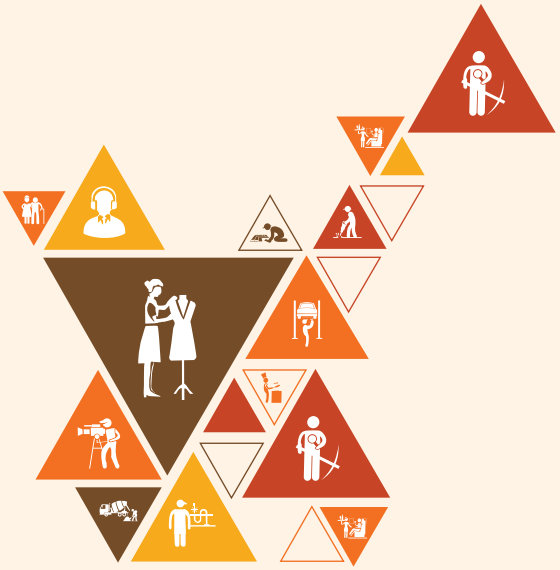
11. Annexures

Annexure I: Training Delivery Plan

Annexure II: Assessment Criteria

Annexure III: List of QR Codes Used in PHB



Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	Telecom Grameen Udhyami		
Qualification Pack Name & Ref. ID	Telecom Grameen Udhyami, TEL/Q4302, V2.0		
Version No.	2.0	**Version Update Date**	31/08/2021
Pre-requisites to Training (if any)	Not Applicable		
Training Outcomes	**By the end of this program, the participants will be able to:** 1. Install cable/system wiring and equipment at customer premises. 2. Apply knowledge and skills to install and troubleshoot various components of broadband infrastructure. 3. Perform coordinating activities for cable laying and pulling. 4. Perform efficient protective and corrective maintenance procedures. 5. Demonstrate proficiency in installing and configuring WiFi Access Point equipment's. 6. Follow procedures for outside plant cable installation. 7. Prepare cables for splicing. 8. Install passive FTTH/X components. 9. Construct FTTH/X cabling inside the building 10. Implement appropriate maintenance procedures to ensure the reliability and performance of optical fibre networks. 11. Apply technical knowledge to repair and restore functionality to handsets. 12. List the entrepreneurial activities performed by the Telecom Grameen Udhyami.		

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
1	**Introduction to the role of a Telecom Grameen Udhyami**	**Role of Telecom Grameen Udhyami in Rural Telecommunications**	• Describe the size and scope of the Telecom industry and its various sub- sectors. • Explain the fundamentals and concept of telecommunication and the terminologies used in the work process. • Explain the role and responsibilities of Telecom Grameen Udhyami.	Bridge Module	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Training Kit - Trainer Guide, Presentations, White-board, Marker, Projector, Laptop, Video Films, Documents of standard operating procedures,	

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• List the various daily, weekly, monthly operations/activities that take place under a Telecom Grameen Udhyami. • Discuss the career progression of a Telecom Grameen Udhyami in the Telecom industry. • Explain the role of Telecom Grameen Udhyami in encouraging entrepreneurial mindset in the village • Discuss the organisational policies on workplace ethics, managing sites, quality standards, personnel management and public relations (PR). • Describe the process workflow in the organization and the role of broadband technician in the process. • Recall the fundamentals of optical fibre and their applications. • Summarize the history of optical fibre. • Solve the challenges faced during handling of fibre optics.			code of conduct, checklists, installation and	8 Theory (5:00) Practical (3:00)
		Analysing the Role and Responsibilities of a Telecom Grameen Udhyami	• Evaluate case studies outlining the role, responsibilities, and challenges for a Telecom Grameen Udhyami. • Analyse the requirements for the course and prepare an action/learning plan for updating skills as per the pre-requisites of the course.				8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Prepare for the role of an Optical fibre splicer by visiting a work site and interacting with others. • Demonstrate how to installing cables inside of homes and businesses or servicing and outdoor lines at a communications company. • Demonstrate how to utilize all varieties of cable construction equipment, cable and safety test equipment, and all types of splicing activity. • Preventive maintenance activities and ensuring effective fault management in case of fault occurrence. • Perform coordinating activities for installation and commissioning of Optical Fibre Cable (OFC) as per the route plan.				
		Understanding Optical Fibre Communication Systems	• Illustrate on working principle of optical fibre communication system. • Compare optical fibre performance parameters like attenuation, bending, dispersion, cut-off wavelength and modified diameter • Explain the various fibre geometric parameters (core, clad and buffer). • Infer the importance of cable jackets, strength members and moisture/ water blocking compounds.				8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Identify the roles and responsibilities of an Optical Fibre Splicer. • Identify the various electrical and electronic components and their specifications. • Discuss the scope/ future and industry of the Wi-Fi broadband. • Performing handset repair including hardware and software components.				
		Technical Support and Maintenance Services	• Performing testing the handset for adequacy. • Post repair and maintaining inventory levels of the hardware components. • Explain complex technical issues to customers in a non-technical, simple to understand manner. • Provide repair and replacement estimates to customers. • Explain the processes and technologies used in installation of Wi-Fi broadband. • State the safety, health and environmental policies and regulations for the workplace as well as for telecom sites in general.				6 Theory (0:00) Practical (6:00)
2	**Handle hand and power tools relevant to construction electrical works**	**Understanding Electrical Principles and Tools for Wiring Applications**	• Explain basic principle of electrical current flow and fundamental concept of alternate and direct current, voltage, resistance, temperature, cross section of conductors, etc.	CON/N0602 PC2, PC3, PC5, PC6, PC7, PC8, PC10	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, printer, projector, white board/ flip chart, marker and duster, Pliers,	

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Discuss locating leaks and short circuits in electrical wiring by using the proper instruments. • Explain Ampere's law, Ohm's law, and electromagnetic field. • Explain the application of tester, mustimeter, digital ammeter etc. • Interpret wiring symbols, SLDs, manufacturer's guidelines and electrical specifications • Discuss use of various electrical hand and power tools such as pliers, crimping tools, electrical drill machines, cutting machines etc. during electrical wiring of house/ building.			Screw Drivers (set), Crimping tools, Wire strippers, Neon tester, Ammeter, Voltmeter, Wattmeter, Ohmmeter, Digital Multimeter, Megger, Tong tester, Measuring tape, Spirit level Marking tools, Drilling machine, Cutting machine, Chasing machine, Electrical socket (set), Tungsten bulb/ CFL/ FSL bulb, Halogen lamp, wall socket, Simple switchboard, Mains breaker switch, Earth Leakage Circuit Breaker (ELCB), Miniature Circuit Breaker (MCB),	8 Theory (5:00) Practical (3:00)
		Electrical Components and Testing Devices	• Explain type of electrical devices like starters, relays and circuit breakers, their power ratings, working principles and use in circuits. • Describe features of switches, fuses, resistors and various circuit protecting devices and their use in electrical circuits and connections. • Discuss about the electrical measuring/ testing tools and devices such as voltage tester, earth tester, mustimeter, digital ammeter, meggers, tong tester, etc.	CON/N0602 PC8, PC9, PC10			8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Electrical Installation and Maintenance Procedures	• Demonstrate how to check proper and safe working of hand and power tools. • Perform fitting of conduits, cables wiring, fixing of electrical fixtures, electrical connection termination at power outlets, etc. using hand and power tools. • Measure size and dimension of wires, conduits as per electrical installation/ maintenance work requirement using measuring instruments	CON/N0602 PC1, PC2, PC4, PC5, PC7,		Helmet, Face shield, Safety goggles, Safety shoes, Safety belt, Insulated rubber gloves, Ear plugs, Particle masks, Reflective jackets, Safety message boards, Fire extinguishers, Sand buckets	8 Theory (5:00) Practical (3:00)
		Electrical Inspection, Installation, and Maintenance Services	• Perform basic inspections of electrical circuits/ wiring using electrical devices like ammeter, voltmeter, meggers, multi-meter, tong tester, earth tester, etc. • Install electrical components like starter, circuit breakers, relays, etc. • Perform maintenance of electrical tools, devices post use as per manufacturer's guidelines.	CON/N0602 PC8, PC9, PC11			6 Theory (0:00) Practical (6:00)
3	**Pre-requisites of Wiring and Wi-Fi backhaul equipment**	**Understanding Job Requirements**	• Describe the importance of interacting with superiors to understand job requirements. • Explain the significance of clear communication in clarifying job expectations.	TEL/N6400 PC1	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop, white board, marker, projector, Cables and equipment, Wi-Fi backhaul, Service Manual/ User Manuals,	8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Summarize the process of gathering information from superiors to effectively plan tasks.			Program Authentication Form, Customer Feedback form, Personal Protection Equipment: safety glasses, head protection, warning signs and tapes	
		Planning and Preparation	• Analyze the importance of planning access to sites for installation/ testing activities. • List the necessary tools, equipment, and materials required for a given work. • Evaluate cable types and connectors to match installation environment/site requirements.	TEL/N6400 PC2, PC3, PC4			8 Theory (3:00) Practical (5:00)
		Ensuring Quality and Safety	• Demonstrate the skill of checking cable length for continuity. • Assess cable running length for potential electrical hazards and obstructions. • Explain the process of liaising with local authorities for outdoor cabling. • Evaluate suitable locations for equipment installation based on cabling norms and signal coverage.	TEL/N4122 PC5, PC6, PC7, PC8			8 Theory (5:00) Practical (3:00)
		Structured Wiring and Installation	• Describe the importance of structured wiring from Point of Presence (PoP) to different sites. • Demonstrate the ability to install neat wiring and clipping at all points up to the equipment. • Implement proper cable terminators/ connectors for effective installation.	TEL/N4122 PC9, PC10, PC11			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Testing and Maintenance	• Demonstrate proper installation of feeder cable termination between equipment and antenna. • Perform testing of cable/joints for transmission loss and strength, and re-terminate if necessary. • Implement safety principles and manufacturer's instructions for equipment installation. • Arrange proper earthing to ensure safe power-up of the system.	TEL/N4122 PC12, PC13, PC14, PC15			8 Theory (5:00) Practical (3:00)
		Waste Management and Site Restoration	• Explain the importance of removing/disposing installation waste properly. • Restore worksite to customer satisfaction after completion of the installation.	TEL/N4122 PC16, PC17			8 Theory (3:00) Practical (5:00)
		Record Keeping and Documentation	• Update records with details of installation and test results. • Complete all installation documents and collect necessary payments if any.	TEL/N4122 PC18, PC19			8 Theory (5:00) Practical (3:00)
		Overall Mastery and Application	• Integrate knowledge and skills gained to successfully complete installation tasks. • Demonstrate proficiency in adhering to safety protocols and industry standards throughout the installation process.	TEL/N4122 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19			4 Theory (1:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
4	**Prepare for Splicing Operations for New Installation**	**Characteristics and Uses of Optical Fibre and Equipment**	• Discuss the characteristics of Optical Fibre, (like refraction, polarization, attenuation, dispersion, etc.) • Explain the uses of various optical equipment (spool, joint closure, connectors, splicer and cleaver), optical test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.), and other tools and equipment, like joint kits, pigtails, patch cords, FDF (Fibre Distribution Frame), ODB (Optical Distribution Box) connector, protection sleeves and heat shrink, etc.	TEL/N6400 C2, PC3, PC6, PC7, PC10, PC13, PC14, PC15, PC16, PC17, PC19, PC20, PC21, PC22, PC23, PC24, PC25, PC27, PC28, PC30, PC31, PC32	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Training kit (Trainer guide, Presentations), Whiteboard, Markers, Duster, Computer, Projector, Participant Handbook, Optical cable test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.), Optical equipment (Spool, Joint closure, Connectors, Splicer and Cleaver), Joint kits, Pigtails, Patch cords, FDF (Fibre Distribution Frame), ODB (Optical Distribu	8 Theory (5:00) Practical (3:00)
		Comprehensive Fault Analysis and Safety Protocols for Tools and Equipment	• Describe fault analysis procedures and safety measures for different tools and mechanical equipment • Discuss the importance of calibrating the test equipment	TEL/N6400 PC4, PC7			8 Theory (3:00) Practical (5:00)
		Colour Coding of Optical Fibre Cable	• Explain the colour coding of optical fibre cable • Discuss the steps of preparing the cable for splicing for new installation	TEL/N6400 PC13, PC16, PC18, PC24, PC27			8 Theory (5:00) Practical (3:00)
		Tools and Equipment for Optical Fibre Splicing	• Identify the tools and equipment required for optical fibre splicing • Demonstrate the operations of various tools and equipment required for optical fibre splicing.	TEL/N6400 PC2, PC3, PC6, PC10, PC13, PC14, PC19, PC20, PC21, PC27, PC28, PC30, PC31, PC32			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Equipment Inspection and Calibration	• Inspect Optical Time Domain Reflectometer (OTDR), Power Meter, Joint Closure, Connectors, Splicer, Cleaver, and other mechanical tools/ equipment for any fault and calibration status	TEL/N6400 PC1, PC2, PC3, PC7, PC28			8 Theory (5:00) Practical (3:00)
		Cable Sheath Damage Prevention	• Employ appropriate practices to find out sheath damage in the cable and secure the cable to avoid the damage	TEL/N6400 PC9, PC11, PC12, PC20, PC22, PC23			8 Theory (7:00) Practical (1:00)
		Cable Preparation for Splicing	• Demonstrate the steps to prepare the cable for splicing for new installation	TEL/N6400 PC16, PC18, PC27			2 Theory (2:00) Practical (0:00)
5	**In-building FTTH/X Cabling**	**Understanding Site Inspection and Planning**	• Identify the key elements in a building lay-out plan. • Analyze and interpret the cabling path from the outdoor fiber landing point to the intended ONT installation point.	TEL/N4201 PC1, PC2	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector, Fibre cables, Fish tape, ONT, Cable trays, VFL, Fibre detection meter	8 Theory (5:00) Practical (3:00)
		Applying Cable Length Calculation and Load Compliance	• Calculate horizontal and vertical cable lengths, considering necessary slack. • Assess pre-existing and post-installation load compliance of cable trays. • Determine whether cable services are currently available and account for them on the cable trays (power cables, additional data/voice cables, etc.)	TEL/N4201 PC3, PC4, PC5			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Implementing Cable Installation Techniques	• Demonstrate proper laying of fibre along identified tray tracks. • Utilize appropriate techniques for fibre pulling through conduit, including the use of tools like fish tape.	TEL/N4201 PC6, PC8			8 Theory (5:00) Practical (3:00)
		Ensuring Cable Security and Management	• Secure fiber along the cable tray with emphasis on proper slack management, especially for vertical runs. • Demonstrate proper coiling and securing of excess fiber at the termination end.	TEL/N4201 PC7, PC9			8 Theory (3:00) Practical (5:00)
		Mastering Cable Installation Methods	• Demonstrate cable installation through false ceiling using the figure 8 method. • Exhibit cable installation through conduits on a false ceiling.	TEL/N4201 PC10, PC11			8 Theory (5:00) Practical (3:00)
		Proficient Fibre Termination and Connectorisation	• Demonstrate fiber termination and connectorization at the ONT. • Display fiber termination skills at the TO.	TEL/N4201 PC12, PC13			8 Theory (7:00) Practical (1:00)
		Testing and Troubleshooting Connectivity	• Demonstrate powering and configuring of ONT. • Test the installed ONT using an IP network. • Undertake Visual Fault Locator (VFL) inspection for the installed fiber run. • Test the live fiber using a fiber detection meter.	TEL/N4201 PC14, Pc15, Pc16, PC17			2 Theory (2:00) Practical (0:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
6	**Configure Equipment and Establish Broadband Connectivity**	**Foundational Connectivity Skills**	• Identify various customer devices and their connectivity requirements. • Access and navigate Customer Premise Equipment (CPE) settings using default login credentials. • Configure CPE with basic network settings such as IP, gateway, and subnet mask. • Verify proper physical connection of cables and connectors.	TEL/N0112 PC1, PC2, PC3, PC4	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop, white board, marker, projector, Types of cables (OFC, UTP, STP, Twisted Pair etc.) and connectors (RJ-45, RJ-11 etc.), crimping tools, soldering tools and splicing tools, signal level meters /OTDR, voltmeter, digital multimeter, digital clamp meter, signal tester, electrical drill, ladd	8 Theory (5:00) Practical (3:00)
		Network Troubleshooting Fundamentals	• Understand the concept of pinging and its significance in network troubleshooting. • Perform a ping test to the service provider gateway and interpret the results. • Demonstrate basic troubleshooting steps to customers for resolving connectivity issues.	TEL/N0112 PC5, PC8, PC13			8 Theory (3:00) Practical (5:00)
		Configuration Management Proficiency	• Analyze test results for connectivity and throughput parameters to ensure network performance. • Record and document CPE configuration settings accurately. • Record and document end-user device configuration settings accurately.	TEL/N0112 PC6, PC9, PC10			8 Theory (5:00) Practical (3:00)
		Effective Communication and Instructio	• Configure end-user devices to establish LAN/WiFi connectivity with CPE. • Document the pinging procedure and expected result parameters clearly.	TEL/N0112 PC7, PC11, PC13			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Brief customers on basic troubleshooting steps and self-help methods effectively.				
		Performance Measurement and Benchmarking	• Perform speed tests to measure data throughputs accurately. • Record and analyse speed test data to ensure compliance with committed service plans.	TEL/N0112 PC12			8 Theory (5:00) Practical (3:00)
		Network Security Awareness	• Recognize the importance of accessing CPE settings securely using default login credentials. • Implement proper configuration settings on CPE to enhance network security. • Document CPE configuration settings securely and maintain confidentiality.	TEL/N0112 PC2, PC3, PC9			8 Theory (3:00) Practical (5:00)
		Best Practices for Securing and Documenting CPE Configuration	• Recognize the importance of accessing CPE settings securely using default login credentials. • Implement proper configuration settings on CPE to enhance network security. • Document CPE configuration settings securely and maintain confidentiality. • Verify physical connections of cables and connectors to ensure compliance with standards. • Record end-user device configuration settings accurately for quality assurance purposes.	TEL/N0112 PC1, PC4, PC10			8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Connectivity Process Improvement and Customer Support	• Perform speed tests to validate compliance with committed service plans and quality standards. • Continuously improve connectivity processes by identifying and addressing customer device requirements. • Provide ongoing support and guidance to customers for troubleshooting network issues to ensure satisfaction.	TEL/N0112 PC12, PC13			4 Theory (1:00) Practical (3:00)
7	**Troubleshoot and Rectify Faults**	**Telecommunication Systems and Maintenance Processes**	• Discuss transmission, broadcasting, switching and operation of telecommunication systems. • Explain electromagnetic interference (EMI) and its impact on. • Describe the functioning of circuit boards and processors. • Discuss the parameters used to identify cause of fault, No Service or service degradation. • Outline the process of testing cables using signal level meters/ OTDR. • Explain how to repair and replace faulty connectors/damaged cable.	TEL/N0113 PC1, PC3, PC4, PC6, PC9, PC10, PC12	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop, white board, marker, projector, Types of cables (OFC, UTP, STP, Twisted Pair etc.) and connectors (RJ-45, RJ-11 etc.), crimping tools, soldering tools and splicing tools, signal level meters /OTDR, voltmeter, digital multimeter, digital clamp meter, signal tester, electrical drill, ladd	8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Trouble-shooting and Main-tenance in Tele-commu-nication Systems	• Describe the process of performing re-connectorisation/ crimping of cable pairs with connector. • Describe and detail the troubleshooting process for common CPE faults, signal loss and continuity and common network issues. • Explain how to monitor and repair system, drop, and in-house signal leakage and maintain records of all the troubleshooting activities undertaken for fault isolation and repairs/replacements.	TEL/N0113 PC4, PC9, PC10, PC12, PC13, PC14			8 Theory (3:00) Practical (5:00)
		Interpret-ing CPE Data and Device Output	• Discuss how to interpret CPE data and other output of the device. • Discuss the process of restoring any changes made to the worksite during fault repair.	TEL/N0113 PC6, PC16			8 Theory (5:00) Practical (3:00)
		Trouble-shooting and Main-tenance of Commu-nication Cables	• Demonstrate the process to identify cause of fault or service degradation. • Employ appropriate techniques to test cables using signal level meters/OTDR. • Apply basic techniques to repair and replace faulty connectors/damaged cable • Perform the steps of re-connectorisation/ crimping of cable pairs with connector.	TEL/N0113 PC1, PC2, PC3, PC4			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Connecting and Configuring CPE	• Demonstrate how to connect CPE to laptop/CPU/ portable device, run diagnostics to find the issue, install the CPE access software, access the CPE through browser/ software application and finally verify the functionality. • Apply basic techniques to re-configure/ reset the CPE to correct settings.	TEL/N0113 PC5, PC6, PC7, PC8			8 Theory (5:00) Practical (3:00)
		Troubleshooting Techniques for Optical Node Connectivity	• Apply appropriate techniques for troubleshooting typical problems between customer equipment and the optical node, common problems such as signal loss and interference, and network/connectivity problems using ping test, trace routes and speed test. • Record all test readings and document the results/ findings in proper formats.	TEL/N0113 PC9, PC10, PC12, Pc14, PC15			8 Theory (7:00) Practical (1:00)
		System, Drop, and In-House Signal Leakage Monitoring and Management	• Demonstrate how to monitor, repair and record system, drop, and in-house signal leakage.	TEL/N0113 PC13			2 Theory (2:00) Practical (0:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
8	**Repairing handsets**	**Analysing Faulty Handheld Devices and Ensuring Timely Repairs**	• Identify the faulty handheld devices from the customer care executives or front-end executives. • Explain how to assist the supervisor in analysing the requirements, issues and functionality problems reported by the customer/front-end team. • Discuss the importance of following timelines and repair commitments as specified in the Service Level Agreement (SLA). • Explain how to plan and prioritize activities related to delivery timeline and issues under supervision.	TEL/N2213 PC1, PC2, PC3, PC4	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop with software like MS Office and Internet, White board, Marker, Projector, Mobile handset, various flashing tools such as Samsung, MediaTek, Qualcomm etc. Real Time Transmission (RTTX) Cable, EDL Cable etc. for flashing, multi-meter, hot air gun, screwdriver, PCB Assembly, Glue, Magnifying Glass, SMD Tester, Software, Adhesive	8 Theory (5:00) Practical (3:00)
		Diagnosing and Resolving Hardware and Software Issues	• Describe how to diagnose the fault and check if it is a hardware or software related issue. • Identify the root cause of the fault to determine if any part requires replacement. • List components available at the store or needs to be ordered from the regional service centre.	TEL/N2213 PC5, PC6, PC7, PC8			8 Theory (3:00) Practical (5:00)
		Repair and Maintenance Procedures for Handset Faults	• State all the options for rectifying the fault under supervisor's guidance. • List the parts to be replaced/repaired from the store/ inventory keeper. • List the tools and equipment required for repair/ replacement of parts.	TEL/N2213 PC9, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC28, PC31			8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Explain calibration process as per the handset manufacturer. • Explain the use of lead-free soldering tools. • Describe the process of sending the repaired handset/ replaced defective part to the authorized personnel. • State all Electrostatic Discharge (ESD) precautions.				
		Maintenance and Repair Procedures in Electronic Devices	• Discuss the importance of backing up all user data using authorized mechanism and medium. • Explain the importance of documenting all the necessary details. • Describe the procedure of receiving/returning all tools and spare components to the store. • Explain how to inform all relevant personnel about the completion of the repair activity. • Explain various flashing tools, Real Time Transmission (RT TX) Cable, etc. for flashing and International Mobile Equipment Identity (IMEI) repairing tools. • Identify the cost of repair and verify if it is within Beyond Economic Repair (BER) • Explain ways to ensure that no damage is caused to the components while repairing.	TEL/N2213 PC16, PC22, PC27, PC29, PC32, PC33			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Explain the formation of alternating and direct Current. • Describe the various Diode-Function, Symbol, Denoting letter, Identification of Solid Transistor-Basics, Types, Symbol, PNP and NPN. • State the concepts of Embedded Multi-Media Card (EMMC) chip off, Re-balling and Soldering.				
		Handset Repair Procedure	• Perform step to inspect the repair table and area for cleanliness. • Demonstrate how to dismantle handset and remove the components/parts as per organizational guidelines/ procedures. • Show how to assist the supervisor in repairing the handset using authorized tools and equipment. • Illustrate how to replace components and parts as per the instructions received by supervisor. • Employ appropriate ways to insert the parts properly and verify they are contained within the body. • Demonstrate how to assemble the handset properly using appropriate tools and appropriate procedure.	TEL/N2213 PC12, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25			8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Demonstrate how to escalate any emergency situation/ unresolved issues to the supervisor. • Employ ways to assist supervisors in checking that the repairs conform to the quality targets in terms of bounce and repeat repair percentages, first time fix etc.				
		Software Fault Rectification and Testing with UMT Dongle	• Perform steps to rectify software faults such as correction/ upgradation, software replacement etc. under supervision. • Demonstrate how to test the effectiveness of the repair using appropriate testing equipment. • Employ appropriate ways to check that the fault has been rectified without any collateral damage to the handset. • Perform steps for usage of Ultimate Multi Tool (UMT) dongle for flashing.	TEL/N2213 PC25, PC26, PC27			8 Theory (3:00) Practical (5:00)
		Advanced Technical Trouble-shooting Techniques	• Illustrate how to install/uninstall licensed and authorised software's to resolve issues. • Demonstrate how to use instruments such as a multi-meter to identify and repair faults in Charging Section, etc. • Perform steps to resolve display related issues by using OCA Lamination Machine, etc.	TEL/N2213 PC5, PC18, PC25, PC26			8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Employ proper ways of using troubleshooting devices such as F Finder Dongle, etc.				
		Hardware Testing, Soldering Quality Assurance, and Mobile Flashing Procedures	• Implement necessary methods to test the functioning of hardware after repairing. • Employ ways to ensure that adequate soldering is used for fixing the component. • Illustrate steps to flash handsets online /offline, use of Miracle Box, Z3X Box for Samsung and setting up of creak Box to spot process disruptions and delay.	TEL/N2213 PC14, PC25, PC26			4 Theory (1:00) Practical (3:00)
9	**Grameen Udhyami initiative and entrepreneurial activities**	**Empowering Rural Connectivity and Techpreneurship**	• Analyse the specific needs and demands for telecom and hardware solutions in a village • Develop a comprehensive business plan, including services, target market, finances, and marketing strategies • Identify the suitable location and describe the necessary infrastructure required to set up a techpreneurial business • Explain the process of obtaining necessary permits and licenses for the business • Define the purpose and benefits of organizing workshops to promote digital literacy in the village	TEL/N4141 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	White board/ black board marker / chalk, Duster, Computer or Laptop attached to LCD projector, Mobile Phones and Tablets, Internet Connectivity, Router and Networking Equipment, Telecom Services Tools, Hardware Repair Kit, Software Tools, Multimeter, Clamp meter,	8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• List the services involved in comprehensive telecom solutions, including SIM card sales, mobile recharge, top-up, and post-paid bill payment • Explain the concept of internet connectivity solutions, such as broadband or wireless connections, for homes and businesses • Elaborate the procedure to set up public Wi-Fi hotspots in central locations, ensuring proper installation and network security • Describe the importance of expert hardware and software repair and troubleshooting services for various devices			Earth tester, Wiring diagrams, Screwdrivers (flathead and Phillips), Pliers (needle-nose and lineman's), Wire strippers, Cable cutters, Cable ties, Electrical tape, Wire connectors, Terminal blocks, Voltage tester, Insulation tester, UPS units (for practical demonstrations), Batteries (for battery replacement practice), Protective gloves, Safety glasses, Safety shoes, Ladder or step stool (for accessing UPS installations),	
		Empowering Communities Through Technology	• Provide fundamental IT services. • Identify ways to collaborate with government officials and NGOs to set up a village information center, including computer setup and internet connectivity • Explain how to coordinate with healthcare providers to set up and manage telemedicine centers, ensuring proper equipment and connectivity • Discuss how to assist in the installation and maintenance of security measures like CCTV cameras, ensuring proper functioning and coverage	TEL/N4141 PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18			8 Theory (5:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Identify various types of UPS and batteries used in them • Explain the role of technology advice and consultation services in helping individuals and businesses make informed decisions • Explain the consequences of not maintaining the UPS regularly • Outline the importance of providing technology-related advice and consultation to individuals and businesses.			Personal protective equipment (PPE), Toolbox or tool kit for storage and organiza-tion and first aid kit..	
		Installing and Con-figuring Internet Connec-tivity Solutions	• Demonstrate the correct procedure to install and configure internet connectivity solutions, such as broadband or wireless connections, in homes and businesses • Show how to configure and establish local area networks (LANs) in offices and homes, enabling file sharing and communication • Show how to install and provide support for software applications, remove viruses and malware, and perform data backup and recovery	TEL/N4141 PC7, PC9, PC11			8 Theory (5:00) Practical (3:00)
		UPS Instal-lation and Mainte-nance Services	• Provide personalized advice and consultation services to individuals and businesses on technology-related matters, addressing their specific needs	TEL/N4141 PC15, PC16, PC17, PC18			6 Theory (5:00) Practical (1:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Perform measurements and analysis of voltage, current, and earthing to ensure correct UPS installation • Demonstrate the process to route the power supply through the UPS and handle power supplies with necessary precautions • Conduct periodic maintenance of the UPS system, including battery checks and replacement, as needed				
Total Duration							Theory: 230:00 Practical: 190:00
Employability Skills (DGT/VSQ/N0101) **(https://www.skillindiadigital.gov.in/content/list)**							30:00
OJT							120:00
Total Duration							PR + TH + OJT + ES= 600 : 00

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Telecom Grameen Udhyami	
Job Role	**Telecom Grameen Udhyami**
Qualification Pack	**TEL/Q4302, V2.0**
Sector Skill Council	**Telecom Sector Skill Council**

S. No.	Guidelines for Assessment
1	The assessment for the theory part will be based on knowledge bank of questions approved by the SSC.
2	Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/ option NOS/ Set of NOS.
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 this criterion.
5	To pass the Qualifications File, every trainee should score a minimum of 50% of aggregate marks.
6	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification File.

Assessment Outcomes	Assessment Criteria for Outcomes	Marks Allocation		
		Theory	Practical	Viva
CON/N0602: Handle hand and power tools relevant to construction electrical works	Handle hand/power tools for electrical works.	30	70	-
	PC1. perform basic checks on power tools prior to use	-	-	-
	PC2. handle hand/power tools for establishing/ terminating electrical connections as per requirement	-	-	-
	PC3. use appropriate tools to trace out short circuits/faults and leakages in electrical wiring	-	-	-
	PC4. use measuring instruments to measure size and dimension of wires, conduits as per electrical installation or maintenance work requirement	-	-	-
	PC5. use hand/ power tools to cut, and bend wire and conduit as per electrical installation or maintenance work requirement	-	-	-
	PC6. use appropriate tools to splice wires by stripping insulation from terminal leads and twisting wires together	-	-	-
	PC7. use appropriate hand/power tools to thread conduit ends, connect couplings, and fabricate and secure conduit support brackets	-	-	-
	PC8. use appropriate electrical measuring devices like ammmeter, voltmeter,meggers etc.to examine electrical units for power interruptions/ continuity	-	-	-
	PC9. use electrical devices such as starters, circuit breakers, relays as per equipment/ wiring installation rating or current rating	-	-	-

	PC10. use diagnostic devices like multi-meter, tong tester, earth tester or similar devices to install, repair power connections	-	-	-
	PC11. perform maintenance and upkeep of relevant tools and devices after use	-	-	-
	NOS Total	**30**	**70**	**-**
TEL/N4122: Wiring and installing equipment at different sites	PC1. interact with the superiors to understand the job requirements	-	1	-
	PC2. plan access to sites for installation/testing activities as per the schedule	1	2	-
	PC3. collect required tools, equipment and materials for a given work	1	2	1
	PC4. match cable type including feeder cable and connectors to installation environment/site requirements as per the plan	1	2	1
	PC5. check cable length for continuity	1	2	1
	PC6. verify that the cable running length is free of electrical hazards and outdoors/indoors obstructions	2	3	-
	PC7. liase with local authorities especially for outdoor cabling	2	3	1
	PC8. select suitable location for equipment installation at different site adhering to cabling norms and signal coverage	2	3	-
	PC9. ensure structured wiring from PoP to different sites	2	3	1
	PC10. install neat wiring and clipping at all points up to the equipment	2	3	-
	PC11. use proper cable terminators/connectors	2	4	-
	PC12. install proper feeder cable termination between equipment and antenna	2	4	1
	PC13. test the cable/joints for transmission loss and strength, re-terminate if loss exceeds prescribed limits	2	4	1
	PC14. install equipment following electrical safety principles and manufacturer's instructions	2	4	-
	PC15. arrange proper earthing to power-up the system	1	4	-
	PC16. remove/dispose installation waste properly	2	4	1
	PC17. restore worksite to customer satisfaction	1	4	1
	PC18. update records with details of installation and test results	2	4	-
	PC19. complete all installation documents and collect necessary payments if any	2	4	1
	NOS Total	**30**	**60**	**10**
TEL/N6400: Splice Optical Fiber	PC1. ensure availability of optical cable test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.)	1	2	1
	PC2. confirm availability of optical equipment (spool, joint closure, connectors, splicer and cleaver)	1	3	-
	PC3. check availability of joint kits, pigtails, patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) connector, protection sleeves and heat shrink	2	3	1
	PC4. send faulty equipment to the logistics team for repair or replacement	2	3	-
	PC5. ensure availability of RCC (Reinforced Cement Concrete) joint chambers with covers and adequate sand as per specifications	2	3	-
	PC6. confirm availability of one spare cable drum for emergency replacement of laid cables	1	2	-
	PC7. ensure calibration status of the equipment to be perform (e.g. splicing machine, OTDR, power meter, cleaver)	2	3	-

	PC8. identify exact location and fiber/fiber group for which the splicing is to be done as per network route and connectivity plan	1	3	-
	PC9. inspect cable for sheath damage visually	1	2	1
	PC10. dismantle/install the fiber joint box/splitter box carefully	1	2	-
	PC11. ensure maintenance of minimum bend ratios as per manufacturer specifications to prevent cable damage and signal degradation	1	2	1
	PC12. secure cable in accordance with the industry practices to avoid cable and sheath damage	1	2	1
	PC13. determine appropriate fibers to be joined based on color coding and sequence	3	1	-
	PC14. identify an appropriate place for the joint chamber location	1	3	-
	PC15. clean fiber as per manufacturer specifications	-	1	-
	PC16. identify the route/fiber and location where splicing/maintenance needs to be done in coordination with Fiber Technician/Operation and Maintenance (O&M) team	1	1	-
	PC17. arrange outage exclusion time (maintenance window timeline) for the fiber and route in consultation with O&M team	1	1	-
	PC18. visit the site to identify the exact location and fiber/fiber group for which the splicing is to be done	1	1	1
	PC19. expose the fiber fault point (by digging for trenched fiber, or opening manholes etc., as required	1	1	-
	PC20. inspect cable for sheath damage visually	1	3	1
	PC21. dismantle/install the fiber joint box/splitter box carefully	1	1	1
	PC22. ensure to maintain minimum bend ratios as per manufacturer specifications to prevent cable damage and signal degradation	1	1	-
	PC23. secure cable in accordance with the industry practice to avoid cable and sheath damage	-	1	-
	PC24. determine appropriate fibers to be joined based on color coding and sequence	2	1	-
	PC25. identify an appropriate place for the joint chamber location	1	1	-
	PC26. clean the fiber as per manufacturer specifications	-	1	-
	PC27. strip cables at areas where splicing has to be performed	1	1	-
	PC28. cleave fiber with a precision cleaver	1	1	1
	PC29. inspect cleaved fiber ends with magnifier to ensure appropriateness	-	1	1
	PC30. insert fiber strands to the fusion machine in accordance with the product/equipment specifications in case of fusion splicing	1	2	-
	PC31. align fibers together by a precision-made sleeve and place the prepared fiber in mechanical splicing kit in case of mechanical splicing	1	1	-
	PC32. use proper splice protectors like heat shrink splice protectors to protect the splice	1	1	-
	NOS Total	**35**	**55**	**10**
TEL/N4201: In-building FT-TH/X cabling	PC1. inspect the site as per building lay-out plan	-	4	-
	PC2. identify the cabling path from the outdoor fiber landing point (in the building premises) up to the intended ont installation point (this to include both the cable tray as well as conduit runs)	2	5	1
	PC3. calculate the horizontal and vertical cable length, accounting for the slack to be maintained	5	-	-

	PC4. ascertain the pre-existing load and post installation load compliance of the cable trays	2	1	1
	PC5. ascertain and account for existing cable services on the cable trays (power cables, other data/voice cables etc.)	-	4	-
	PC6. lay the fiber along the identified tray tracks using appropriate cable pulling method	1	3	1
	PC7. secure the fiber along the cable tray ensuring proper slack management (especially for the vertical run)	-	5	-
	PC8. demonstrate fiber pulling through conduit using appropriate technique and tools (pulling through strength member and using correct tools like fish tape)	2	5	1
	PC9. demonstrate proper coiling and securing of excess fiber (approx. 3 meter) at the termination end	2	4	-
	PC10. demonstrate cable installation through false ceiling, using figure 8 method	2	5	1
	PC11. demonstrate cable installation through conduits on false ceiling	2	5	1
	PC12. demonstrate fiber termination and connectorisation at ONT	3	5	1
	PC13. demonstrate fiber termination at TO	-	5	1
	PC14. demonstrate powering and configuring of ONT	2	3	-
	PC15. test installed ONT using IP network	2	2	1
	PC16. undertake VFL (Visual Fault Locator) for the installed fiber run	3	2	1
	PC17. test the live fiber using fiber detection meter	2	2	-
	NOS Total	**30**	**60**	**10**
TEL/N0112: Configure customer premises equipment and establish Broadband connectivity	PC1. connect up laptop/PC, smart/ip TV and other customer device to the CPE and establish connectivity	3	4	1
	PC2. access Customer Premise Equipment (CPE) settings using default login credentials	4	4	1
	PC3. configure CPE as per the base setting (ip, gateway, mask etc.)	4	4	1
	PC4. verify that all cables and connectors are plugged in properly	3	4	1
	PC5. ping the service provider gateway	2	4	1
	PC6. analyse test results for connectivity and throughput parameters	4	4	1
	PC7. configure end user device to establish LAN/WiFi connectivity with CPE	4	4	1
	PC8. ping CPE from end user device and analyse response	3	4	1
	PC9. record CPE configuration settings	4	4	-
	PC10. record end user device configuration settings	3	4	1
	PC11. record pinging procedure and expected result parameters	2	4	-
	PC12. perform speed test and record the data throughputs and show customer that they are as per committed plan	2	3	1
	PC13. brief customer on basic trouble-shooting steps/self help	2	3	-
	NOS Total	**40**	**50**	**10**
TEL/N0113: Troubleshoot and rectify faults	PC1. identify cause of fault, No Service or service degradation	2	2	1
	PC2. test cabling using signal level meters /OTDR	2	2	1
	PC3. repair and replace faulty connectors / damaged cable	2	4	-
	PC4. perform re-conectorization/crimping (of cable pairs with connector) or replace cable, if required	4	2	1

	PC5. connect CPE to laptop/CPU/portable device	2	2	1
	PC6. access CPE through browser/software application and run diagnostic application	2	2	1
	PC7. install CPE access software, if required	4	2	-
	PC8. re-configure/reset the CPE to correct settings	3	2	1
	PC9. troubleshoot/repair problems between customer equipment and the optical node	4	4	1
	PC10. troubleshoot problems for signal loss and interference	4	4	1
	PC11. take readings at all splitter points and terminated ends to determine the signal loss and continuity	2	4	-
	PC12. perform network troubleshooting including ping test, trace routes and speed test	4	6	1
	PC13. monitor, repair and record system, drop, and in-house signal leakage	2	4	1
	PC14. record steps undertaken for fault localization/isolation	1	6	-
	PC15. record repairs/replacements undertaken during fault rectification	1	2	-
	PC16. restore any changes made to the worksite during fault repair to the client's satisfaction	1	2	-
	NOS Total	**40**	**50**	**10**
TEL/N2213: Repair and test handsets	PC1. collect the faulty handheld devices from the customer care executives or front-end executives	2	-	-
	PC2. assist the supervisor in analysing the requirements, issues and functionality problems reported by the customer/front-end team	2	-	-
	PC3. identify the timelines and repair commitments based on the directions received from supervisor and as specified in the Service Level Agreement (SLA)	2	-	-
	PC4. plan and prioritize activities related to delivery timeline and issues under supervision	2	-	-
	PC5. diagnose the fault as listed in the company specific database under supervision and check if it is a hardware or software related issue	2	6	1
	PC6. assist the supervisor in identifying the root cause of the fault to determine if any part requires replacement	-	-	1
	PC7. identify the cause of fault by conducting appropriate diagnostic tests	2	-	-
	PC8. check if the part or component required for repair is available at the store or needs to be ordered from the regional service centre	-	4	-
	PC9. list all options for rectifying the fault under supervisor's guidance	2	-	1
	PC10. collect the parts to be replaced/repaired from the store/inventory keeper	-	2	-
	PC11. collect all tools and equipment required for repair/replacement of parts	-	2	-
	PC12. inspect the repair table and area to check if its clean and dust free	2	-	1
	PC13. check if all equipment required for repair and testing are calibrated as per the specified environment parameters detailed by the handset manufacturer	2	-	1
	PC14. check if lead-free soldering tools are available and ready for use	2	-	-
	PC15. verify that all Electro Static Discharge (ESD) precautions are considered before starting repair	1	-	-

	PC16. backup all user data using authorized mechanism and medium	-	4	-
	PC17. dismantle handset and remove the components/parts under supervision and as per organizational guidelines/procedures	-	4	-
	PC18. assist the supervisor in repairing the handset using authorized tools and equipment	-	4	1
	PC19. replace components and parts w.r.t manufacturer specifications as per the instructions received by supervisor	-	4	1
	PC20. verify that all parts of the handset are inserted properly and are contained within the body	2	-	-
	PC21. assemble the handset properly under supervision of superior using appropriate tools and appropriate procedure	-	4	-
	PC22. document the package details about case parts/components that are replaced and hold warranty	1	-	-
	PC23. escalate any emergency situation/unresolved issues to the supervisor	1	-	-
	PC24. assist supervisors in checking that the repairs conform to the quality targets in terms of bounce and repeat repair percentages, first time fix etc.	-	4	1
	PC25. perform necessary software fault rectification such as correction/ upgradation, software replacement etc. under supervision	-	4	2
	PC26. test the effectiveness of the repair based on the directions received by supervisor and by using appropriate testing equipment	2	2	2
	PC27. check that the fault has been rectified without any collateral damage to the handset	1	2	1
	PC28. send the repaired handset to the authorized personnel	1	1	-
	PC29. return all tools and equipment to the store in clean and working condition	1	1	-
	PC30. clean the repair bench/table to ensure no loose screws/parts are lying around	1	-	1
	PC31. send the replaced defective part to the authorized personnel	2	1	-
	PC32. document the repairs and replacement work for the handset along with time, date, handset specifications, complaint number etc.	1	-	-
	PC33. inform all relevant personnel (including supervisors, front-end teams) about the completion of the repair activity	1	1	1
	NOS Total	**35**	**50**	**15**
TEL/N4141: Provide Techpre-neurial Solutions in the Village	PC1. identify the village's needs and demands for telecom and hardware solutions	3	2	-
	PC2. create a comprehensive plan outlining the services, target market, finances, and marketing strategies	5	1	-
	PC3. choose a suitable location and set up infrastructure	-	2	1
	PC4. obtain necessary permits and licenses	-	-	2
	PC5. organize workshops in the village to promote digital literacy	2	-	1
	PC6. offer comprehensive telecom services including SIM card sales, mobile recharge, top-up, and post-paid bill payment facility for mobile, landline and DTH services	2	3	1
	PC7. provide internet connectivity solutions for homes and businesses in the village including broadband or wireless internet connections	2	4	1

	PC8. establish public Wi-Fi hotspots in central locations, such as community centers or schools, to offer affordable internet access to the villagers	2	-	1
	PC9. set up local area networks (LANs) in offices and homes, facilitating file sharing and communication	3	4	-
	PC10. provide expert hardware and software repair services for mobile phones, computers, laptops, WiFi equipment, and other related devices	2	5	-
	PC11. deliver basic IT solutions, including software installation, virus and malware removal, data backup and recovery to ensure smooth functioning of computers and devices for individuals and businesses	3	6	-
	PC12. collaborate with government officials and NGOs to set up village information center with computers and internet access to provide valuable information on agriculture, healthcare, government schemes, etc.	-	-	2
	PC13. collaborate with healthcare providers to setup telemedicine centres for connecting villagers with medical professionals remotely	-	-	2
	PC14. assist in implementing security measures, like CCTV cameras to enhance safety and security in the village	-	6	1
	PC15. provide advice and consultation services to individuals and businesses on technology-related matters, helping them make informed decisions	2	-	2
	PC16. checks for voltage, current, and earthing, as well as analyse basic wiring diagrams to facilitate the correct installation of the UPS	4	6	1
	PC17. rout the power supply through the UPS and exercise precautions while handling power supplies	2	6	-
	PC18. conduct periodic maintenance of the UPS system	3	5	-
	NOS Total	**35**	**50**	**15**
DGT/VSQ/N0102: Employability Skills (60 Hours)	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	-	-	-
	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	-	-	-
	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	-
	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	-	-	-

	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**	**-**

Annexure III

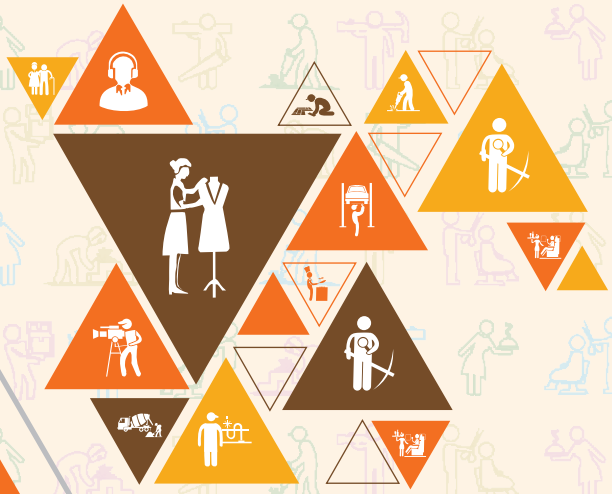
List of QR Codes Used in PHB

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
1. Introduction to the role of a Telecom Grameen Udhyami	Unit 1.1: Introduction to the Telecom Sector and the role of Telecom Grameen Udhyami	1.1.1 Telecom Sector in India	45	https://youtu.be/PirV-lZn9y-I?si=cubgR3BhPntGyDPX	Telecom-munication Sector Of India
	Unit 1.2: Optical Fiber Technology and the Role of an Optical Fiber Splicer	1.2.1 Introduction to Optical Fibre Technology	45	https://youtu.be/G-UyeFDsX-II?si=iF4gaeTx4HmqHhb5	Optical fiber in hindi
2: Handle hand and power tools relevant to construction electrical works	Unit 2.1: Electrical Fundamentals and Circuits	2.1.1 Basic principle of electrical current flow and fundamental concept	81	https://youtu.be/nzmoGca5rX-c?si=zHhMMrD5VQbBJ_qH	Flow of Electricity through a Circuit
3. Pre-requisites of Wiring and Wi-Fi Backhaul Equipment	3.1: Installation of Wi-Fi System	3.1.1 Analysing Work Orders and Job Sheets	106	https://www.youtube.com/watch?v=P8j2H5J4fU4	How to Set Up a Wi-Fi Network
		3.1.2 Wi-Fi Backhaul	106	https://www.youtube.com/watch?v=-DIbLZ3hL9M	Wireless OR Wired Backhaul Benefits

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
	3.2: Complete Documentation	3.2.1 Importance of Satisfactory Customer Service	106	https://www.youtube.com/watch?v=WnQ7L4WFrcQ	Why is customer service important?
		3.2.3 Different Payment Modes	106	https://www.youtube.com/watch?v=GUurzvS3DlY	What is a payment gateway and how does it work?
4. Prepare for Splicing Operations for New Installation	UNIT - 4.1 Manage tools and spares	4.1.1 Characteristics of Optical Fibre	138	https://www.youtube.com/watch?v=G-UyeFDsXlI	Characteristics of Optical Fibre
		4.1.2 Various Optical Equipment	138	https://www.youtube.com/watch?v=SDPfA8k0dUc	Various Optical Equipment
	UNIT - 4.2 Pre-Installation Procedures	4.2.1 Specifications of Fibre Optic Cable	138	https://www.youtube.com/watch?v=77dOO5hvd58	Specifications of Fibre Optic Cable

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
		4.2.3 Factors Affecting Choosing of Cables	138	https://www.youtube.com/watch?v=1oYYB7AGeMo	Factors Affecting Choosing of Cables
		4.2.6 Colour Coding of Optical Fibre Cable	138	https://www.youtube.com/watch?v=eCpujviAo9g	Colour Coding of Optical Fibre Cable
	UNIT - 4.3 Installation of Optical Fibre	4.3.1 Installing OFC	138	https://www.youtube.com/watch?v=fYwBgqDdLLQ	Installing OFC
5. In-building FTTH/X Cabling	5.1: Basics of Fiber Optics	5.1.2 Bend Radius	165	https://www.youtube.com/watch?v=wGaJMVQt7qc	Bend Radius - EXFO's Animated Glossary of Fiber Optics
	5.2: Installation of Optical Fibers	5.2.1 Fusion Splicing	165	https://www.youtube.com/watch?v=PFIegqsQFrs	How To Fusion Splice Fiber Optic Cable - Animated

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
6. Configure Equipment and Establish Broadband Connectivity	UNIT 6.1: Network Topologies	6.1.1 Topology	185	https://youtu.be/uSKdjjw-5zow?si=QsrvvkJsV2RTsyJh	Network Topology
7. Troubleshoot and Rectify Faults	UNIT 7.1: Escalation Matrix	7.1.1 Escalation Matrix	215	https://youtu.be/2Xuv_gSlC-Qg?si=AY4WqG-drdIJ85Og	Security escalation matrix
8. Repairing handsets	UNIT 8.1 Prepare for repairing a handset	8.1.3 Importance of Service Level Agreement (SLA)	277	https://youtu.be/DBqe-di6-Bm3s?si=DvMtTJjj6Ele-M8y9	Service Level Agreements
9. Grameen Udhyami initiative and entrepreneurial activities	Unit 9.1: Business Planning and Infrastructure Setup	9.1.5 Process of Obtaining Necessary Permits and Licenses for the Business	340	https://youtu.be/T58A-cuv-j6s?si=nBjb2RjdzYXBCsuB	Business Registration In India
Employability Skills				https://www.skillindiadigital.gov.in/content/list	



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