Skill India
कौशल भारत-कुशल भारत

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

Facilitator Guide

Sector
Telecom

Sub-Sector
Passive Infrastructure

Occupation
Operations and Maintenance - Passive Infrastructure

Reference ID: TEL/Q6400, Version 4.0
NSQF level: 3

Optical Fiber Splicer

Scan/Click this QR Code
to access eBook

This book is sponsored by

Telecom Sector Skill Council of India

Estel House, 3rd Floor, Plot No:- 126, Sector 44

Gurugram, Haryana 122003

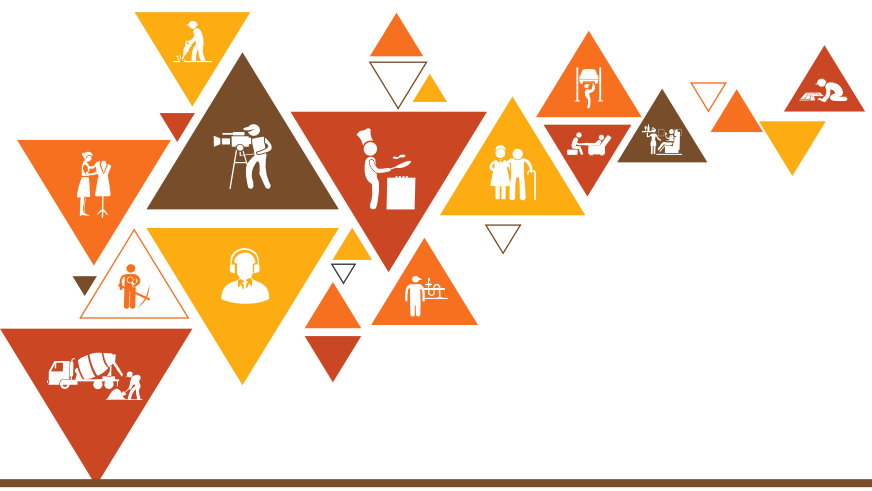
Phone: 0124-2222222

Email: tssc@tsscindia.com

Web: www.tsscindia.com

First Edition, December 2022

Printed in India

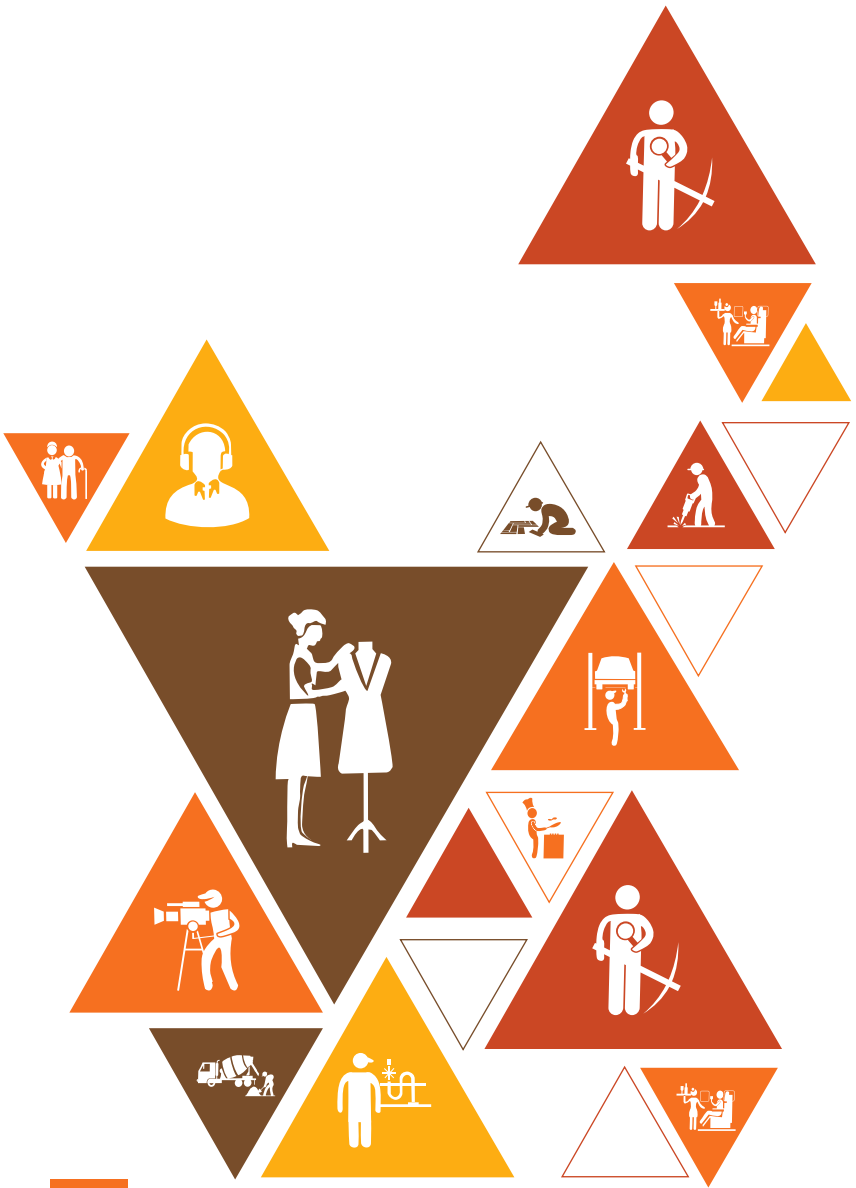


Disclaimer

The information contained herein has been obtained from sources reliable to Telecom Sector Skill Council of India. Telecom Sector Skill Council of India disclaims all warranties to the accuracy, completeness or adequacy of such information. Telecom Sector Skill Council of India shall have no liability for errors, omissions, or inadequacies, in the information contained herein, or for interpretations thereof. Every effort has been made to trace the owners of the copyright material included in the book. The publishers would be grateful for any omissions brought to their notice for acknowledgements in future editions of the book. No entity in Telecom Sector Skill Council of India shall be responsible for any loss whatsoever, sustained by any person who relies on this material.

> 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 Optical Fiber Splicer is primarily designed to facilitate skill development and training of people, who want to become professional IOptical Fiber Splicers 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. TEL/N6400 – Splice Optical Fiber
2. TEL/N6401 – Test Effectiveness and Record Test Results
3. TEL/N9101 – Organize Work and Resources as Per Health and Safety Standard
4. TEL/N9102 – Interact effectively with Team Members and Customers
5. DGT/VSQ/N0101: Employability Skills (30 Hours)

Post this training, the participants will be able to perform tasks as professional Optical Fiber Splicer. 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

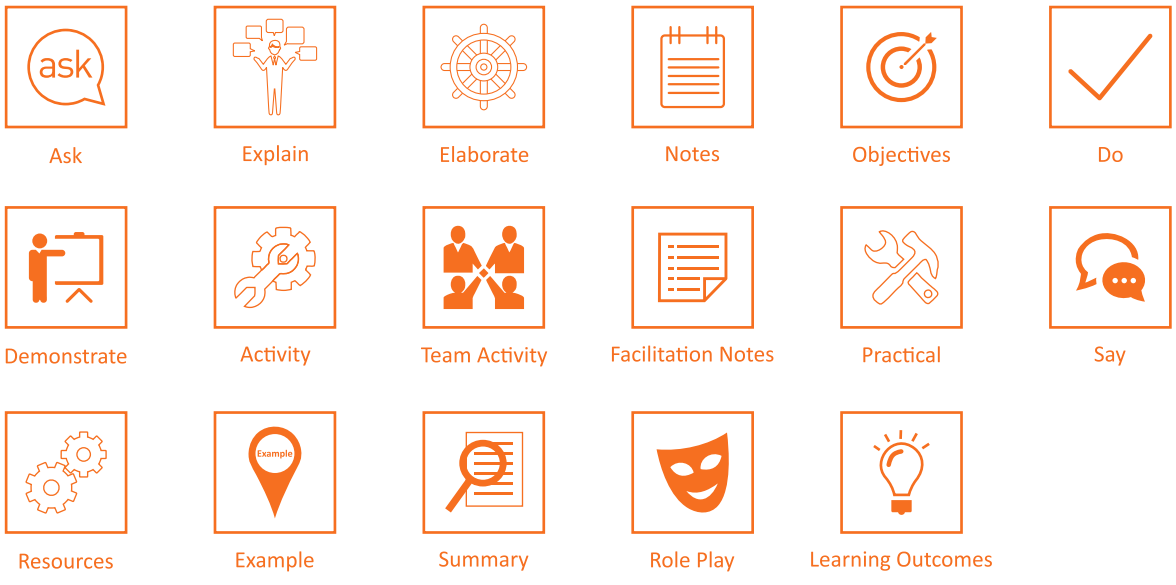


Table of Contents

S. No	Modules and Units	Page No
1.	Role and Responsibilities of an Optical Fiber Splicer	1
	Unit 1.1 - Objectives of the Program	3
	Unit 1.2 - Telecom Sector in India	6
	Unit 1.3 - Telecom Basics	9
2.	Prepare for Splicing Operations for New Installation (TEL/N6400)	13
	Unit 2.1 - Manage Tools and Spares	15
	Unit 2.2 - Pre-Installation Procedures	18
	Unit 2.3 - Installation of Optical Fibre	21
	Unit 2.4 - Preparing the Cable for Splicing	23
3.	Maintenance and Splicing of Optical Fiber (TEL/N6400)	27
	Unit 3.1 - Optical Fibre Splicing	29
	Unit 3.2 - Maintenance of Fibre Optics	32
4.	Fiber Testing and Documentation (TEL/N6401)	37
	Unit 4.1 - Testing Optical Fibre Cable	39
	Unit 4.2 - Testing Optical Fibre Cable	42
5.	Plan Work Effectively, Optimise Resources and Implement Safety Practices (TEL/N9101)	45
	Unit 5.1 - Plan Work Effectively, Optimise Resources and Implement Safety Practices	47
	Unit 5.2 - Different types of Health Hazards	49
	Unit 5.3 - Importance of Safe Working Practices	52
	Unit 5.4 - Reporting Safety Hazards	54
	Unit 5.5 - Waste Management	56
	Unit 5.6 - Organisations' Focus on the greening of jobs	59
6.	Communication and Interpersonal Skills (TEL/N9102)	63
	Unit 6.1 - Interaction with Supervisor, Peers and Customers	65

S. No	Modules and Units	Page No
7.	**DGT/VSQ/N0101 : Employability Skills (30 Hours)** **https://www.skillindiadigital.gov.in/content/list**	91
8.	Annexures	69
	Annexure I: Training Delivery Plan	70
	Annexure II: Assessment Criteria	85
	Annexure III: List of QR Codes Used in PHB	91

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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

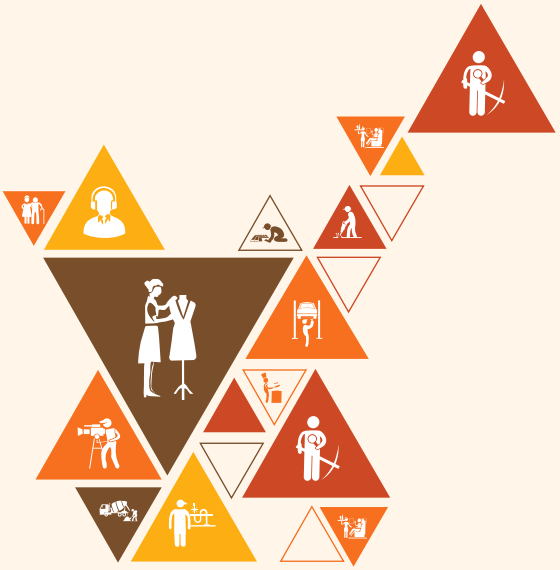
Telecom
Sector
Skill
Council

1. Role and Responsibilities of an Optical Fiber Splicer

Unit 1.1 - Objectives of the Program

Unit 1.2 - Telecom Sector in India

Unit 1.3 - Telecom Basics



Key Learning Outcomes 

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

1. Outline the course objectives and outcomes
2. Discuss the size and scope of the Telecom industry and Passive Infrastructure sub-sector
3. Identify the roles and responsibilities of an Optical Fibre Splicer
4. Discuss the career progression of an Optical Fibre Splicer in the Telecom industry

Unit 1.1: Objectives of the Program

Unit Objectives

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

1. Explain the overview of the program
2. Discuss the essential skills on which the participant will be trained in this program

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

This is the first session of the program. Introduce yourself, the program and its purpose in detail. Welcome the trainees cordially to the session. Explain that you are going to put them at ease by playing a game. This game is meant to break the ice between everyone and get the trainees interested in the class.

The key learning outcomes and unit objectives were mentioned at the module's beginning. Make sure that these outcomes and objectives are shared with the participants at the beginning, and when the module gets over, do collective feedback to ensure all have been covered.

Say

Good morning, participants and a very warm welcome to this training program called """Optical Fiber Splicer"""."

Do

- Start by welcoming all the participants to the training program and conveying a message of encouragement.
- Thank all the participants for joining and being a part of this training program
- Introduce yourself briefly to participants, your name and background, and your role in the training program
- Talk about your expectations from them about their conduct, laying ground rules
- Explain the rules of the game you are going to play as an "Ice Breaker".

Note

- Please ensure that while introducing yourself, you share at least one piece of personal information, such as your hobbies, likes, dislikes etc., with the participants. This will facilitate participation and exchange in many ways.
- Take a keen interest in understanding the needs and aspirations of the participants before actually conducting the training

Say

Before we start the training, let us spend some time introducing ourselves and knowing each other. We shall play a game.

Activity

- Arrange the class in a semi-circle/circle
- Each of us will tell the class their name, hometown, hobbies and special quality about themselves, starting with the 1st letter of their name. I will start with mine.
- Say your name aloud and start playing the game with your name.
- Say, “Now, each of one you shall continue with the game with your names till the last person in the circle/ semi-circle participates”.
- Listen to and watch the trainees while they play the game.
- Ask questions and clarify if you are unable to understand or hear a trainee.

Activity	Duration	Resources used
Ice Breaker	60 minutes	Pen, Notebook, Notebook, etc.

Remember to:

- Discourage any queries related to one’s financial status, gender orientation or religious bias during the game
- Try recognising each trainee by their name because it is not recommended for a trainer to ask the name of a trainee during every interaction

Say

Did you all enjoy this activity? I hope you all had a good time during this icebreaker session. Now we are all well acquainted with each other, and this will help us go ahead with our training session.

Note

In this unit, we will discuss about the Telecom Sector in India.

Say

Let us begin the session by discussing about the Telecom Sector in India.

Ask

Ask the trainees the following questions:

- Which government organisation do you think regulates the telecom sector in India?

Write down the trainees' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following point:

- This program is aimed at training candidates for the job of a "Optical Fiber splicer", in the "Telecom" Sector/ Industry.
- Overview of the program
  - Basic skills
  - Main activities
- Ground rules

Do

- Ensure all the trainees participate in the icebreaker session
- Jot down the crucial points on the whiteboard as the trainees speak

Notes for Facilitation

- Ask the participants if they have any questions
- Encourage peer learning in the class

Unit 1.2: Telecom Sector in India

Unit Objectives

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

1. Outline the size and scope of the Telecom industry in India
2. Outline the growth and opportunities in the broadband industry
3. Discuss about optical fibres technology
4. List the roles and responsibilities of the Optical Fibre Splicer
5. Illustrate the career progression of an Optical Fibre Splicer

Resources to be Used

Participant Handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer

Note

In this unit, we will discuss the fundamentals of GSM/UMTS/LTE architecture.

Say

Good morning and welcome back to this training program, “Optical Fiber splicer”. Today we shall discuss about the telecom sector in India.

Ask

Ask the participants the following questions:

- What do you understand by telecom?
- What is fiber optics?

Write down the participants’ answers on a whiteboard/flipchart. Take appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following point:

- Introduction to the telecom industry
- Various sub-sectors of the telecom industry
  - Telecom Infrastructure

  - Telecom equipment
  - Telecom services
- Broadband industry
- Optical fibre technology
  - Application
  - Advantage
  - Significance
  - Elements of optical fibre
- Types of Optical fibre
  - Classification based on the refractive index
  - Classification based on the materials
  - Classification based on the mode of propagation of light
- Optical fibre splicer
- Need for splicing of optical fibres
- Splicing techniques
  - Fusion Splicing
  - Mechanical Splicing
- Advantages and Disadvantages of fibre splicing
- Job role of fibre optic splicer
- Physical requirements of an optical fibre splicer
- Career progression of an Optical Fibre Splicer

Say

Let us participate in an activity to explore the unit a little more.

Activity

- This is a group activity
- Divide the class into four groups and provide chart paper and other required items to each group
- Now, ask each group to make a chart paper presentation on types of Optical Fibre:
  - Based on the refractive index - Step Index Fibres & Graded Index Fibres
  - Based on the materials used - Plastic Optical Fibres & Glass Fibers
  - Based on the mode of propagation of light - Single-Mode Fibres & Multi-mode Fibres
- Ask them to explain each of the types
- They can use hand-drawn diagrams or pasted pictures
- After the groups complete their work, collect all the charts and evaluate them

Activity	Duration (in mins)	Resources used
Chart paper activity	60 minutes	Participant Handbook, Pen, Notebook, Chart paper, Sketch pens, pencils, eraser, ruler, laptop, etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Answer all the queries/doubts raised by the trainees in the class
- Encourage other trainees to answer problems and boost peer learning in the class

Unit 1.3: Telecom Basics

Unit Objectives

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

1. Explain and outline the functioning of the public switched telephone network
2. Identify and describe various media of transmission
3. List important telecom terminologies

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about the telecom basics.

Say

Good morning and welcome back to this training program on “Optical Fiber splicer”. In this session, we will learn about the telecom basics.

Ask

Ask the participants the following questions:

- What is Point-to-point communication?
- Have you heard of PSTN Network?

Write down the participants’ answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following point:

- Basics of Telecom
  - Transmitter
  - Transmission medium
  - Receiver

- Point-to-point communication
- Broadcast communication
- Public Switched Telephone Network (PSTN)
- Types of transmission media
- Important telecom terminology

Say

Let us participate in an activity to explore the unit a little more.

Activity

- This is an individual activity
- Display the pictures of different transmission media on the projector
- Ask the trained to identify each type and state their usages
- Ask them to note down the answers in the note book

Activity	Duration (in mins)	Resources used
See and identify	30 minutes	Participant Handbook, Pen, Notebook, laptop, internet connection, overhead projector, etc.

Do

- Show the following pictures of different transmission media




Notes for Facilitation

- Ensure that all the trainees participate in the activity
- Encourage participants to ask relevant questions
- Ensure that all the trainees answer every question listed in the participant handbook

Exercise

MCQ

1. a) second-largest
2. a) Telecom infrastructure
3. a) Fibre optics
4. a) Fibre Optical Splicer
5. a) Transmitter

Answer the following

1. Refer UNIT 1.2: Telecom Sector in India
   Topic - 1.2.9 Physical Requirements of Optical Fibre Splicer
2. Refer UNIT 1.2: Telecom Sector in India
   Topic - 1.2.1 Introduction to Telecom Industry
3. Refer UNIT 1.2: Telecom Sector in India
   Topic - 1.2.4 Optical Fibre Technology
4. Refer UNIT 1.2: Telecom Sector in India
   Topic - 1.2.2 Various Sub-Sectors of the Telecom Industry
5. Refer career progression
   Topic - 1.2.10 Career progression of an Optical Fibre Splicer

Skill India
कौशल भारत-कुशल भारत

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

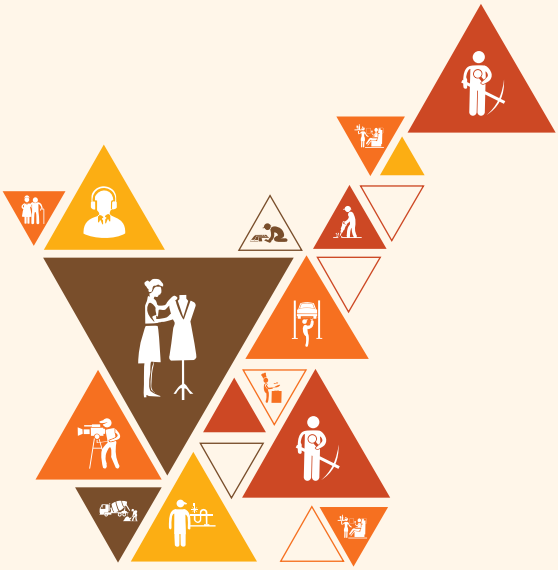
2. Prepare for Splicing Operations for New Installation

Unit 2.1 - Manage Tools and Spares

Unit 2.2 - Pre-Installation Procedures

Unit 2.3 - Installation of Optical Fibre

Unit 2.4 - Preparing the Cable for Splicing



TEL/N6400

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 2.1: 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 (like refraction, polarisation, attenuation, dispersion, etc.)
2. Identify various fibre optics tools.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about managing tools and spares.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about managing tools and spares.

Ask

Ask the trainees the following questions:

- What do you know about Total Internal Reflection?
- How can a light wave be polarised?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Characteristics of Optical Fibre
  - Total Internal Reflection
  - Polarisation
  - Attenuation
  - Dispersion
- Various optical equipment

Say

Let us participate in an extempore activity to understand this unit better.

Activity

- This is an individual activity
- Display the pictures of different fiber optics tools on the projector
- Ask the trainees to identify each type and mention their usages
- Ask them to note down the answers in the notebook

Activity	Duration (in mins)	Resources used
See and identify	30 minutes	Participant Handbook, Pen, Notebook, laptop, internet connection, overhead projector, etc.

Do

- Show the following pictures of different transmission media

Notes for Facilitation

- Ensure that all the trainees participate in the activity
- Encourage participants to ask relevant questions
- Ensure that all the trainees answer every question listed in the participant handbook

Unit 2.2: 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

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about pre-installation procedures.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will learn about the pre-installation procedures.

Ask

Ask the participants the following questions:

- What is the bend radius of a fiber optics?
- What is attenuation in transmission lines?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following point:

- Specifications of fibre optic cable
  - Tensile strength
  - Bend radius
  - Crush and impact
  - Attenuation
  - Fibre optic cable continuity
- Factors affecting OFC
- Factors affecting choosing of cables
- Handling optical fibre cable
  - Handling process
  - Cable unloading
  - Cable unwrapping
  - Cable storage
  - Environmental storage issues
- Pre-installation - Drum Inspection
- Colour coding of optical fibre cable
  - Cable jacket colours
  - Connector colour codes
  - Fibre colour codes

Say

Let us participate in an activity to explore the unit a little more.

Activity

- This is an individual activity
- Provide optical fiber and Continuity testers or a Visual fault locator
- Now, ask each trainee to perform the continuity test and check if the fiber optics cable is damaged or not
- Conclude the activity by summarising key takeaways

Activity	Duration (in mins)	Resources used
Optical fiber continuety test	45 minutes	Participant Handbook, Pen, Notebook, Laptop, Overhead projector, Optical fiber, Continuity testers, etc.

Do

- Ensure proper safety during the activity
- Ensure, all the trainees, gets the hands-on experience

Notes for Facilitation

- Encourage teamwork and active participation
- Answer all the doubts raised by the trainees in the class

Unit 2.3: 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
2. Demonstrate effective reporting and documentation skills

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about the installation of fiber optics

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss the procedure for installing fiber optics.

Ask

Ask the trainees the following questions:

- What is trenching?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Installing OFC
  - Trenching
  - Aerial cabling
  - Ducting process

- Conduct figuring
- Cable pulling & blowing
- OFC termination method

- Testing and closing activities
- Reporting and documentation

Say

Let us participate in a practical activity to explore the unit a little more.

Practical

- Ask the trainees to gather at the practical lab
- Make small groups consisting of four trainees in each group
- Ask each group to perform OFC termination using fibre optics connector boot
- Provide them with the required tools and equipment
- Carefully observe them throughout the practical

Activity	Duration (in mins)	Resources used
Terminating OFC	120 minutes	Participant handbook, pen, notebook, laptop, overhead projector, fibre optics connector boot, wire striper, alcohol wipes, fiber cleaver, etc.

Do

- Ensure proper safety during the activity
- Ensure that all the trainees get the hands-on experience
- Guide the trainees in performing correct procedures throughout the activity

Notes for Facilitation

- Encourage teamwork and active participation
- Answer all the doubts raised by the trainees in the class

Unit 2.4: 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 the new installation

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about preparing the cable for splicing.

Say

Good morning and welcome back to this training program on “Optical Fiber Splicer”. In this session, we will learn about preparing the cable for splicing.

Ask

Ask the trainees the following questions:

- What is the use of an Optical Time Domain Reflectometer?

Write down the trainees’ answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Instruments used for testing and splicing of OFC
  - Optical Time Domain Reflectometer (OTDR)
  - Power Meter
  - Fusion splicer machine
- Calibration of test equipment
  - Optical Time Domain Reflectometer
  - Optical Power Meter Calibration
  - Optical Light Source Verification
  - Optical Attenuator Verification
  - PMD Calibration
- Steps of preparing the cable for splicing for new installation
  - Use a protective sleeve (FSKP)

Say

Let us participate in an activity to explore the unit a little more.

Activity

- This is an individual activity
- Display pictures of different instruments used for testing and splicing of optical fiber
- Ask each trainee to identify each instrument and note it down in the notebook
- After completing, ask random students to describe the use of each instrument they have identified, its specification and utility

Activity	Duration (in mins)	Resources used
See and identify	45 minutes	Participant handbook, Pen, Notebook, Laptop, Internet Connection, Overhead Projector, etc.

Do

- Display the following pictures on the projector for the trainees to identify

Notes for Facilitation

- Share your inputs and insight to encourage the trainees.
- Ensure that all trainees participate in the class.

Exercise

Answer from PHB

Multiple-choice Question

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

Descriptive

1. Refer UNIT 2.1: Manage tools and spares
   Topic - 2.1.1 Characteristics of Optical Fibre
2. Refer UNIT 2.1: Manage tools and spares
   Topic - 2.1.1 Characteristics of Optical Fibre
3. Refer Unit 2.3: Installation of Optical Fibre
   Topic - 2.2.1 Installing OFC
4. Refer Unit 2.3: Installation of Optical Fibre
   Topic - 2.2.1 Installing OFC
5. Refer Unit 2.3: Installation of Optical Fibre
   Topic - 2.2.1 Installing OFC

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

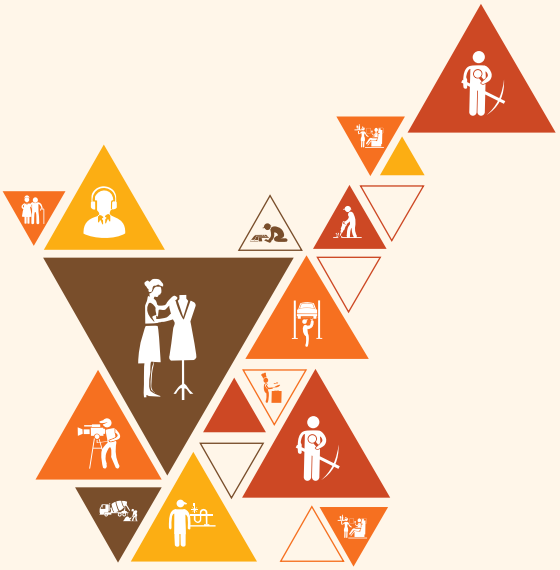
N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Telecom
Sector
Skill
Council

3. Maintenance and Splicing of Optical Fiber

Unit 3.1 - Optical Fibre Splicing

Unit 3.2 - Maintenance of Fibre Optics



TEL/N6400

Key Learning Outcomes

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

1. Demonstrate splicing of the optical fibre
2. Discuss signal strength and quality KPIs of optical fibre cables
3. Perform sealing joint closure heat shrinking/multi-diameter seals/mechanical seals, etc.
4. Interpret the standard operating procedures while performing preventive maintenance of the laid optical fibre cables

Unit 3.1: Optical Fibre Splicing

Unit Objectives

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

1. Elaborate the optical fibre splicing process
2. Explain different types of optical fibre splicing
3. Identify spicing problems and troubleshoot them
4. Demonstrate effective safety norms during splicing

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about optical fibre splicing.

Say

Good morning and welcome back to this training program on “Optical Fiber Splicer”. In this session, we will discuss about optical fibre splicing.

Ask

Ask the trainees the following questions:

- What is splicing?
- What is the need to splice fiber optics?

Write down the trainees’ answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Splicing of OFC
  - Why do we need to splice optical fibres?
- Types of Optical Fibre Splicing
  - Mechanical Splicing
  - Fusion Splicing
- Steps to perform mechanical splicing
- Types of mechanical splicing
  - V-Grooved Splicing
  - Elastic-Tube Splicing
- Fusion Splicing
  - Steps for fusion splicing
- Material and equipment used for splicing
- Tips for better splices
- Evaluating splices
  - Bad splices
  - Splice problem troubleshooting
- Optical fibre safety overview
- Splicing safety – Norms and Rules

Say

Let us participate in an activity to explore the unit a little more.

Practical

- This is a practical activity
- Ask the trainees to gather at the practical lab
- Make small groups consisting 4 - 5 trainees in each group
- Ask each group to perform fusion splicing of an optical fiber cable sample
- Provide them with the required tools and equipment to perform the activity
- Carefully observe them throughout the practical and share your inputs whenever necessary

Activity	Duration (in mins)	Resources used
Fusion splicing	120 minutes	Participant handbook, pen, notebook, laptop, overhead projector, fibre optics cable sample, wire striper, IPA cleaner & wipes, fiber cleaver, Fusion splicer, heat shrink plastic, etc.

Do

- Ensure proper safety during the activity
- Ensure all the trainees get the hands-on experience
- Guide the trainees throughout the activity

Notes for Facilitation

- Encourage teamwork and active participation
- Answer all the doubts raised by the trainees in the class

Unit 3.2: Maintenance of Fibre Optics

Unit Objectives

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

1. Discuss the principles of optical transport media
2. Discuss signal strength and quality KPIs of optical fibre cables
3. Illustrate the processes of preventive maintenance of the laid optical fibre cables
4. List the factors that affect the performance of fibre optic cables
5. Demonstrate sealing joint closure heat shrinking/multi-diameter seals/mechanical seals, etc.
6. Perform regular maintenance activities for the laid fibre cable

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about the maintenance of fibre optics.

Say

Good morning and welcome back to this training program on “Optical Fiber Splicer”. In this session, we will discuss about the maintenance of fibre optics.

Ask

Ask the trainees the following questions:

- What is Tandem Connection Monitoring?
- How to remove contaminations in fiber optics?

Write down the trainees’ answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Principles of optical transport media
  - Optical Transport Network
  - Optical Transport Medium
- Signal strength of optical fibre cables
  - Quality KPIs of Optical Fibre Cables
- Factors affecting the performance of fibre optic installations
  - Poor connector terminations
  - Dirty connector ends
  - Poor installation
  - Patch leads
  - Crossed-over patch leads
- Preventive maintenance of fibre optic cables
  - Procedures for preventive maintenance
- Sealing joints
- Heat shrinking
- Multi-diameter seals
- Alignment errors in fibre optic cable

Say

Let us participate in a group discussion to explore the unit a little more.

Activity

- Conduct a group discussion in the class on “Preventive maintenance of fibre optic cables.”
- Ask the participants what they have learnt from this exercise
- Ask if they have any questions related to what they have talked about so far
- Close the discussion by summarising the importance of preventive maintenance in maintaining the optimal signal strength

Activity	Duration (in mins)	Resources used
Group discussion	40 minutes	Participant handbook, pen, notebook, laptop, overhead projector, microphone (if needed), etc.

Do

- Ensure that all the trainees participate in the group discussion
- Ensure a friendly atmosphere during the group discussion
- Guide the students in identifying key points

Notes for Facilitation

- Encourage peer learning
- Answer all the doubts raised by the trainees in the class
- Discuss the proper communication technique in group discussion

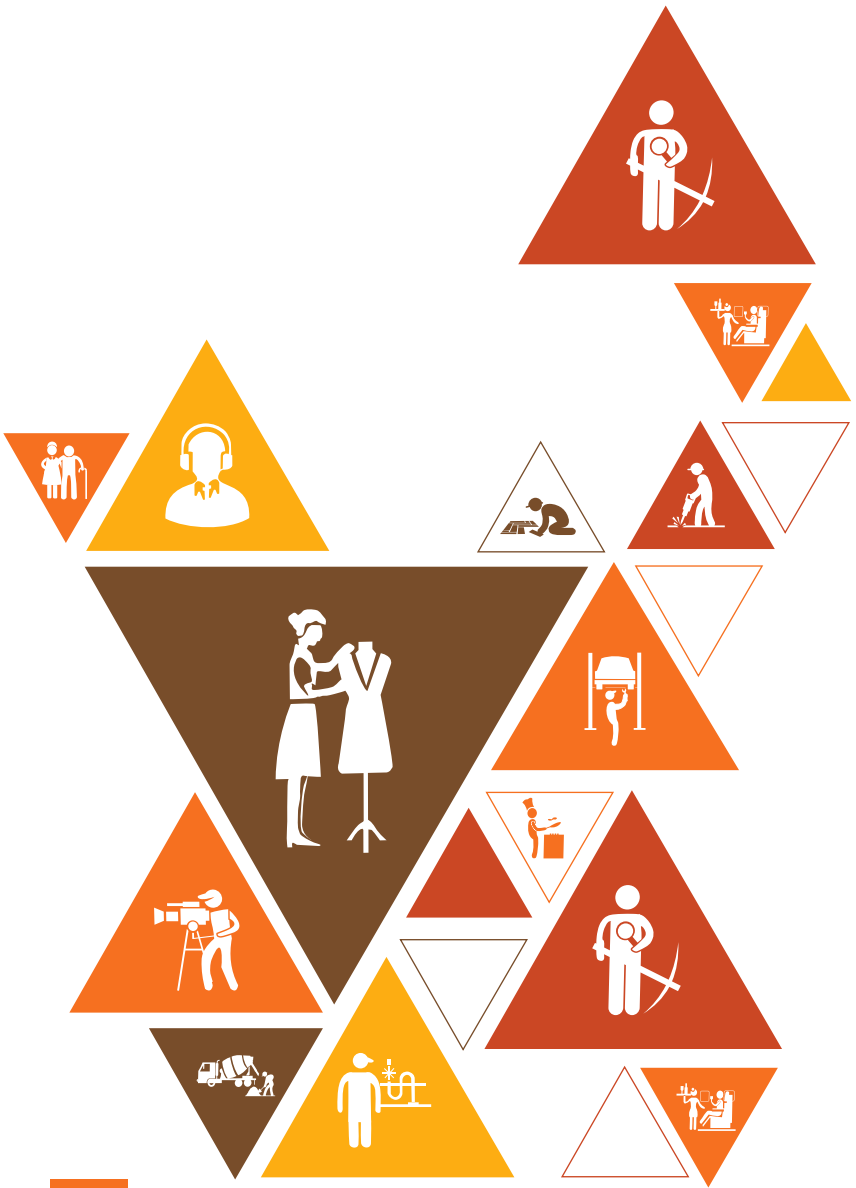
Exercise

Multiple-choice Question

1. a) Splicing of OFC
2. a) Mechanical Splicing
3. a) 1.5
4. a) Stripping the fibre
5. a) Elastic-Tube Splicing

Answer the following:

1. Refer UNIT 3.1: Optical Fibre Splicing
   Topic - 3.1.1 Splicing of OFC
2. Refer UNIT 3.1: Optical Fibre Splicing
   Topic – 3.1.2 Types of Optical Fibre Splicing
3. Refer UNIT 3.1: Optical Fibre Splicing
   Topic - 3.1.1 Splicing of OFC
4. Refer UNIT 3.1: Optical Fibre Splicing
   Topic – 3.1.4 Evaluating Splices
5. Refer UNIT 3.1: Optical Fibre Splicing
   Topic - 3.1.6 Splicing Safety – Norms and Rules



Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

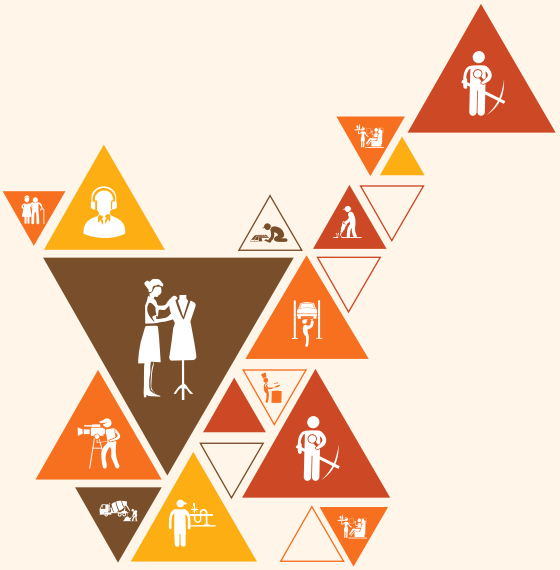
N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Telecom
Sector
Skill
Council

4. Fiber Testing and Documentation

Unit 4.1 - Testing Optical Fibre Cable

Unit 4.2 - Testing Optical Fibre Cable



TEL/N6401

Key Learning Outcomes

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

1. Explain the working procedures of OTDR (Optical Time Domain Reflectometer) and Power meter
2. Elaborate the need and the method/procedure to measure the optical losses in the optical fibre cable
3. Discuss commonly occurring hazards, like Earth Potential Rise (EPR), while carrying out the work
4. Perform the procedure of troubleshooting optical fibre
5. Record all jointing test readings and analyse the test result to generate the acceptance report
6. Perform the procedure to generate a sample report using the results/findings in proper formats

Unit 4.1: Testing Optical Fibre Cable

Unit Objectives

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

1. Demonstrate the testing of the effectiveness of optical fibre cable using OTDR (Optical Time Domain Reflectometer)
2. Explain the importance of adhering to the standards and following optimal values of OTDR, power meter and light meter for the test results
3. Explain various losses in optical fibre

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about testing optical fibre cable.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about testing optical fibre cable.

Ask

Ask the trainees the following questions:

- What is the use of OTDR?
- What are intrinsic optical fibre losses?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- OTDR (Optical Time-Domain Reflectometer)
- Key OTDR specifications
- Other important product specifications
- Factors to take into account when choosing an OTDR
- Losses in the optical fibre cables
  - Intrinsic optical fibre losses
  - Splicing loss
  - Bending loss or radiative losses
  - Connector loss
  - Coupling loss
- Insertion loss test
  - Insertion loss test
  - Optical return loss test procedure
  - Miscellaneous test
- OTDR Creating a work report for optical fibre construction

Say

Let us participate in a practical activity to explore the unit a little more.

Practical

- This is a group practical activity
- Ask the trainees to gather at the practical lab
- Make small groups consisting 4 - 5 trainees in each group
- Ask each group to perform the Insertion Loss Test of an optical fiber cable
- Provide them with the required tools and equipment to perform the activity
- Carefully observe them throughout the practical and share your inputs whenever necessary

Activity	Duration (in mins)	Resources used
Insertion Loss Test	40 minutes	Participant handbook, pen, notebook, laptop, overhead projector, light source, power supply, power meter, fibre optic cable sample, reference cable, alcohol wipes, connectors, etc.

Do

- Ensure proper safety and use of protective equipment during the activity
- Ensure all the trainees get the hands-on experience
- Guide the trainees throughout the activity

Notes for Facilitation

- Encourage teamwork and active participation
- Answer all the doubts raised by the trainees in the class

Unit 4.2: Testing Optical Fibre Cable

Unit Objectives

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

1. List commonly occurring hazards while carrying out the work
2. Discuss fibre optics installation safety procedure

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about hazards associated with fibre optics.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about hazards associated with fibre optics.

Ask

Ask the trainees the following questions:

- What do you understand by materials safety?
- What is Earth Potential Rise (EPR)?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Eye safety
- Materials safety
  - Earth Potential Rise (EPR)
- Fibre Optic Installation Safety Rules

Say

Let us participate in a quiz to explore the unit a little more.

Activity

- Divide the class into four groups and give a name to each group
- Explain the rules of the quiz. For each correct answer, the group gets 1 mark. If the group is unable to answer, the question is rolled over to the next group
- Explain the purpose and duration of the activity
- On the whiteboard, write the names of the groups
- Conduct the quiz on hazards associated with fibre optics and safety practices
- Keep a score for the groups
- Set guidelines pertaining to discipline and expected tasks

Activity	Duration (in mins)	Resources used
Quiz	30 minutes	Participant handbook, pen, notebook, laptop, overhead projector, whiteboard, marker, microphone (if needed), etc.

Do

- Share your inputs and insight to encourage the trainees and add to what they talk about.
- Ensure that all trainees participate in the class

Notes for Facilitation

- Encourage teamwork and active participation
- Answer all the doubts raised by the trainees in the class

Exercise

Multiple Choice Questions

1. a) OTDR
2. a) Optical Time Domain Reflectometer
3. a) Event Dead Zone
4. a) extrinsic
5. a) relative
6. a) Optical return loss

Answer the following:

1. Refer UNIT 4.1: Working in a team environment
   Topic - 4.1.2 Key OTDR specifications
2. Refer UNIT 4.1: Working in a team environment
   Topic - 4.1.4 Factors to Take into Account when Choosing an OTDR
3. Refer UNIT 4.1: Working in a team environment
   Topic - 4.1.6 Insertion Loss Test
4. Refer UNIT 4.2: Hazards Associated with Fibre Optics
   Topic - 4.2.1 Eye Safety and 4.2.2 Materials Safety
5. Refer UNIT 4.2: Hazards Associated with Fibre Optics
   Topic - 4.2.2 Materials Safety

Skill India
कौशल भारत-कुशल भारत

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

5. Plan Work Effectively, Optimise Resources and Implement Safety Practices

Unit 5.1 - Plan Work Effectively, Optimise Resources and Implement Safety Practices

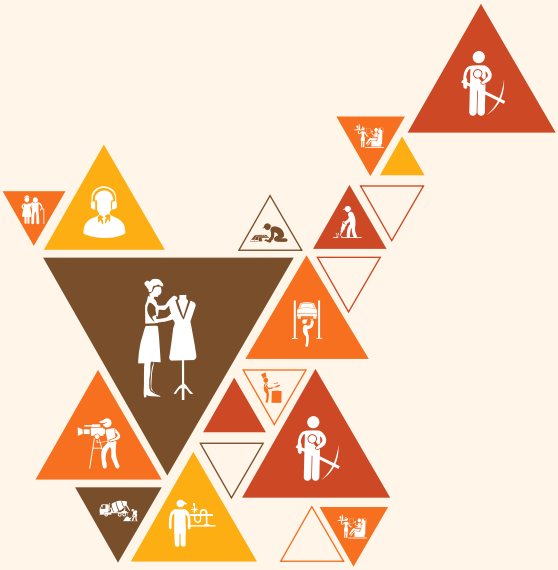
Unit 5.2 - Different types of Health Hazards

Unit 5.3 - Importance of Safe Working Practices

Unit 5.4 - Reporting Safety Hazards

Unit 5.5 - Waste Management

Unit 5.6 - Organisations' Focus on the greening of jobs



TEL/N9101

Key Learning Outcomes

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

1. Explain about workplace health and safety
2. Differentiate various health hazards
3. Demonstrate various first-aid techniques
4. Importance of safety at the workplace
5. Understand Basic hygiene Practices and hand-washing techniques
6. Explain the need for social distancing
7. Understand the reporting of hazards at the workplace
8. Explain e-waste and the process of disposing of them
9. Explain the greening of jobs

Unit 5.1: Plan Work Effectively, Optimise Resources and Implement Safety Practices

Unit Objectives

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

1. Understand about workplace health and safety
2. Explain tips to design a safe workplace
3. Explain precautions to be taken at a workplace

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about workplace health & safety.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about workplace health & safety practices.

Ask

Ask the trainees the following questions:

- What do you understand by workplace safety?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Safety: Tips to design a safe workplace
- Non-Negotiable employee safety habits

Say

Let us participate in an extempore activity to understand this unit better.

Activity

- This activity will be based on individual performance.
- Provide each trainee with a printout/Xerox copy of the safety hazard report
- Now ask each of them to fill up the report individually
- After completing, collect all the forms and evaluate them
- End the session by providing constructive feedback

Activity	Duration (in mins)	Resources used
Role-play – Safety Hazard Report	40 minutes	Participant handbook, whiteboard, notebook, laptop, pen, pencil, marker, printout/Xerox copy of safety hazard report, etc.

Do

- Ensure that the report contains all possible hazards in the workplace, safety measures, and ways to counter the hazards if they occur
- Guide the trainees throughout the activity

Notes for Facilitation

- Ask the trainees if they have any questions
- Encourage other trainees in the class to answer it and encourage peer learning in the class
- Explain the consequences of not following the safety guidelines at the workplace

Unit 5.2: Different types of Health Hazards

Unit Objectives

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

1. Understand the health hazards
2. Demonstrate First Aid Techniques

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, equipment and tools

Note

In this unit, we will discuss about various health hazards.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about different types of health hazards.

Ask

Ask the trainees the following questions:

- What is a health hazard?
- Can you name any health hazards that may occur at the workplace?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- First aid
- First aid techniques
  - For burns
  - For broken bones and fractures
  - For heart attack/stroke
  - For head injury
- Using breathing apparatus
- Briefing and guidance for firefighters
- Evacuation process
- Special evacuation requirements for specially-abled persons
- Importance of fire safety drills

Say

Let us participate in an activity to understand this unit better.

Activity

- This session will be in the form of a “Show and Explain “ activity.
- In this activity, bring a few PPE (relevant to the job role) to the class and demonstrates each of them - safety helmet, safety goggles, gloves, ear muff, respirator, harness, safety boots, etc.
- Now ask the trainees to identify the PPE and state their usage
- After the session, you will select a few volunteers and make them wear PPEs.
- The focus of this activity is to select and use appropriate personal protective equipment compatible with the work and compliant with relevant occupational health and safety guidelines.

Activity	Duration (in mins)	Resources used
Practical activity - PPE	40 minutes	Participant handbook, laptop, overhead projector, internet connection, various protective equipment like safety helmet, safety goggles, gloves, ear muff, respirator, harness, safety boots, etc.

Do

- Ensure that all trainees participate in the activity
- Share your inputs and insight to encourage the trainees and add to what they talk about

Notes for Facilitation

- Encourage peer learning in the class
- Use video references from different sources for a better explanation

Unit 5.3: Importance of Safe Working Practices

Unit Objectives

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

1. Explain Basic Hygiene Practices
2. Understand the importance of Social Distancing
3. Demonstrate the safe working practices

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about the importance of safe working practices.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about the importance of safe working practices

Ask

Ask the trainees the following questions:

- List a few personal hygiene tips that you regularly follow.
- How social distancing helps to reduce the spread of Covid 19?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Basic hygiene practices
  - Personal hygiene
  - Personal hygiene practices at home
- Importance of social distancing

- Social distancing and isolation
- Self-quarantine
- Disposing off the PPE kits

- Safe workplace practices
  - Supplies and Accessories in the first aid box
  - CPR

Say

Let us participate in a practical activity to understand this unit better.

Practical

- Gather all the trainees in the laboratory and divide them into groups of two
- Ask each group to demonstrate the correct process for performing CRP
- Ensure the students follow all the steps of CPR in the correct sequence
- This activity can also be performed on a dummy, if available

Activity	Duration (in mins)	Resources used
Practical activity - CPR	60 minutes	Participant handbook, whiteboard, notebook, laptop, pen, marker, dummy (if available), etc.

Do

- Prepare in advance and use appropriate energisers
- Encourage the students to explore how the training session can help them improve their work
- Keep the ambience constructive and positive
- Ensure each contribution is given fair consideration

Notes for Facilitation

- Answer all the questions/doubts raised by the trainees in the class
- Encourage other trainees to answer queries/questions and boost peer learning in the class

Unit 5.4: Reporting Safety Hazards

Unit Objectives

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

1. Discuss the process of reporting in case of emergency (safety hazards)
2. Understand methods of reporting hazards

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about reporting safety hazards

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about reporting safety hazards.

Ask

Ask the trainees the following questions:

- What is a safety hazard?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Methods of reporting safety hazards
- Describing hazard matrix
- Hazard report form

Say

Let us participate in an activity to understand this unit better.

Activity

- Divide the class into small groups
- Conduct a quiz and ask questions related to the unit
- Display all questions on the projector screen
- Display the correct answer after all groups have got their chances of answering a given question

Activity	Duration (in mins)	Resources used
Quiz – Interpreting Signs	40 minutes	Laptop, internet connection, overhead projector, white screen, whiteboard, markers, laser pointer

Do

- Ask a student to maintain the scores on the whiteboard
- Jot down the crucial points on the whiteboard as the students speak
- Share your inputs and insight to encourage the students and add to what they talk about
- Ensure that all students participate in the class
- Ask a student to summarise what was discussed in the session
- Demonstrate enthusiasm for the subject matter, course and participant's work

Notes for Facilitation

- Ask the trainees if they have any questions
- Encourage other trainees to answer it and encourage peer learning in the class
- Ask them to answer the questions given in the participant manual

Unit 5.5: Waste Management

Unit Objectives

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

1. Understand what e-waste is
2. Understand the concept of waste management
3. Explain the process of recycling e-waste

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about waste management.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss about waste management.

Ask

Ask the trainees the following questions:

- What do you understand by waste management?
- What are the sources of medical waste?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Introduction to e-waste
  - What is e-waste?
- Electronic goods/gadgets are classified under three major heads
- E-waste management process
- Recyclable and non-recyclable waste
- Colour codes of waste collecting bins
- Waste disposal methods
- Sources of waste
- Source of Pollution
- Types of Pollution – Air, Water, Soil, Noise, Light

Say

Let us participate in an extempore activity to understand this unit better.

Activity

- This activity will be based on individual performance.
- In this activity, you will give two topics to the trainees
- The first topic in this session will be air pollution.
- The second topic on which the trainees will prepare their extempore will be on waste disposal method.
- You will randomly pick up trainees and separate them into two groups.
- Ensure that the trainees are equal in number.
- Allot the trainees 2 minutes to prepare the topic you will give them.
- After the time is up, you will call out any trainee and ask them to speak on the topic for 5 minutes.
- The trainee, with a simple explanation but rich content, will be appreciated with accolades.

Activity	Duration (in mins)	Resources used
Extempore	40 minutes	Participant Handbook, Whiteboard, Notebook, Notebook, Pen, Pencil, Marker, etc.

Do

- Conduct a doubt clarification session if needed.
- Encourage the non-participating trainees to open up and speak

Notes for Facilitation

- Encourage other participants to answer it and encourage peer learning in the class
- Answer all the doubts in case any of the participants

Unit 5.6: Organisations' Focus on the greening of jobs

Unit Objectives

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

1. Understand the concept of ESG
2. Explain the different factors of ESG

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss about organisations' focus on the greening of jobs.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss the organisations' focus on the greening of jobs.

Ask

Ask the trainees the following questions:

- What is ESG?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- What is ESG?
  - ESG stands for Environmental, Social, and Governance.
  - Environmental, social, and governance (ESG) investing refers to a set of standards for a company's behaviour used by socially conscious investors to screen potential investments.

- Investors are increasingly applying these non-financial factors as part of their analysis process to identify material risks and growth opportunities.
- Factors of ESG
  - Environmental
  - Social
  - Governance

Say

Let us participate in a group discussion to explore the unit a little more.

Activity

- Conduct a group discussion in the class on the factors of ESG
- Ask the participants what they have learnt from this exercise
- Ask if they have any questions related to what they have talked about so far
- Close the discussion by summarising the importance of the ESG in recent times

Activity	Duration (in mins)	Resources used
Group discussion	45 minutes	Participant handbook, whiteboard, notebook, notebook, pen, pencil, marker, microphone, etc.

Do

- Ensure that all the trainees participate in the group discussion
- Ensure a friendly and cordial atmosphere during the group discussion
- Guide the students in identifying key points

Notes for Facilitation

- Encourage peer learning
- Answer all the doubts raised by the trainees in the class
- Discuss the proper combination technique in group discussion

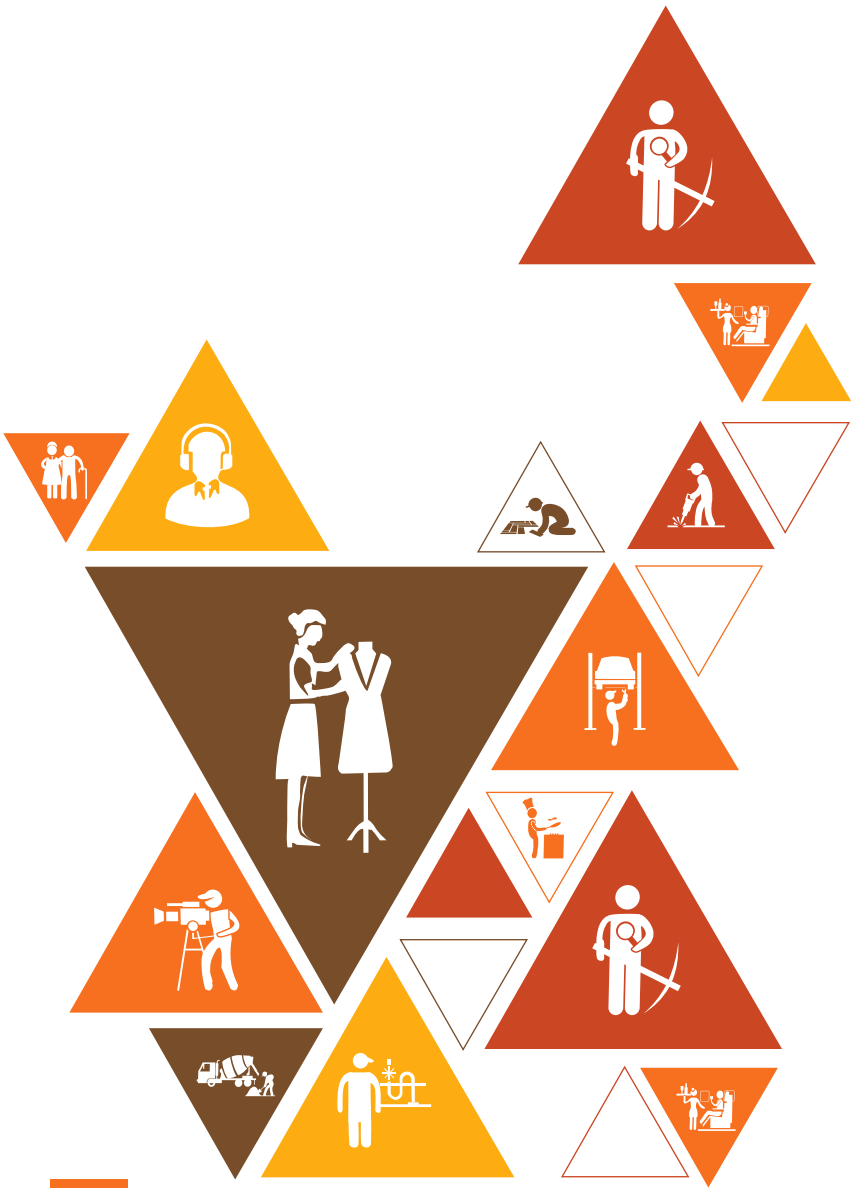
Exercise

Multiple Choice Questions

1. a. First Aid
2. b. Luke warm
3. a. Antiseptic
4. a. Chemical hazards
5. a. Cardio Pulmonary Resuscitation

Answer the following:

1. Refer UNIT 3.6: Organisations' Focus on the greening of jobs
   Topic - 3.6.1 What is ESG?
2. Refer UNIT 3.2: Different types of Health Hazards
   Topic - Special Evacuation Requirements for Specially Abled Persons
3. Refer UNIT 3.2: Different types of Health Hazards
   Topic - 3.2.1 First Aid
4. Refer UNIT 3.5: Waste Management
   Topic - 3.5.4 E-waste Management Process



Skill India
कौशल भारत-कुशल भारत

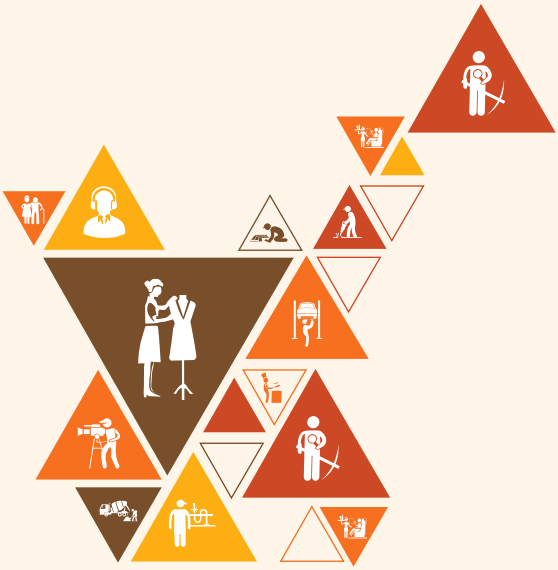
सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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

Telecom
Sector
Skill
Council

6. Communication and Interpersonal Skills

Unit 6.1 - Interaction with Supervisor, Peers and Customers



TEL/N9102

Key Learning Outcomes 

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

1. Understand what communication is and the importance of communication in the workplace
2. Understand effective communication and communicate effectively for success
3. Discuss types of communication - verbal and non-verbal
4. Communicate at workplace
5. Communicate effectively with superiors
6. Communicate effectively with colleagues and customers using different modes viz face-to-face, telephonic and email communication
7. Understand the hurdles to effective communication
8. Conduct professionally at the workplace
9. Respect differences in gender and ability
10. Communicate effectively with a person with disabilities
11. Respect for disabled people

Unit 6.1: Interaction with Supervisor, Peers and Customers

Unit Objectives

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

1. Understand the importance of communication
2. Understand types of communication

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, equipment and tools

Note

In this unit, we will discuss how to communicate with supervisors, peers and customers.

Say

Good morning and welcome back to this training program on "Optical Fiber Splicer". In this session, we will discuss how to interact with supervisors, peers and customers.

Ask

Ask the trainees the following questions:

- What is communication?
- What is non-verbal communication?
- What are the barriers to effective communication?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- What is communication?
- Why is communication important?
- Effective communication
  - Effective communication for success
  - Significance of clear and effective communication
- Types of communication
  - Verbal communication
  - Non-Verbal communication
    - Signs and symbols
    - Gestures and expressions
- Communication at workplace
  - Communication with supervisors
  - Communication with colleagues & customers
  - Face-to-face communication
  - Telephonic communication
  - Email communication
- Importance of timely completion of tasks
- Standard operating procedure
- Escalation matrix
  - Escalation mechanism
  - Escalation through CRM
- Escalation Issues at work
  - What does it mean to escalate an issue at work?
  - When should you escalate an issue at work?
- Hurdles for effective communication
- Professional conduct
- Respect gender differences
- Communication with a disabled person
  - Communicating with people with a hearing impairment
  - Respect People with disability
  - Safety at the workplace for people with disability
    - Responsibilities of an employer towards disabled people
- Workplace adaptations for people with disability
  - Workplace adaptations

Say

Let us participate in an activity to understand this unit better.

Activity

- This is an individual activity
- Provide the trainees with a hypothetical situation mentioned below
- Consider one of your colleagues who has been facing discriminatory attitudes at the workplace related to unequal wages. Imagine yourself to be their confidant.
- State what measures you will take to solve the issue/s faced by your team member.
- Repeat the activity with all the trainees

Activity	Duration (in mins)	Resources used
Mock activity	60 minutes	Participant handbook, whiteboard, laptop, notebook, pen, pencil, marker, etc.

Do

- Ensure that all trainees participate in the class.
- Encourage the non-participating trainees to open up and speak.

Notes for Facilitation

- Ask them to answer the questions given in the participant manual.
- Ensure that all the participants answer every question.
- Answer all the doubts raised by the trainees in the class
- Discuss the proper communication technique in group discussion

Exercise

Multiple Choice Questions

1. a. Signature
2. a. Late
3. b. Polite
4. a. Gestures
5. b. Effective communication

Answer the following:

1. Refer UNIT 4.1: Interaction with Supervisor, Peers and Customers
   Topic - 4.1.2 What is Communication?
2. Refer UNIT 4.1: Interaction with Supervisor, Peers and Customers
   Topic - 4.1.23 Communicating with People with a Hearing Impairment
3. Refer UNIT 4.1: Interaction with Supervisor, Peers and Customers
   Topic - 4.1.9 Face-to-face Communication
4. Refer UNIT 4.1: Interaction with Supervisor, Peers and Customers
   Topic - 4.1.21 Respect Gender Differences
5. Refer UNIT 4.1: Interaction with Supervisor, Peers and Customers
   Topic - 4.1.19 Hurdles for Effective Communication

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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

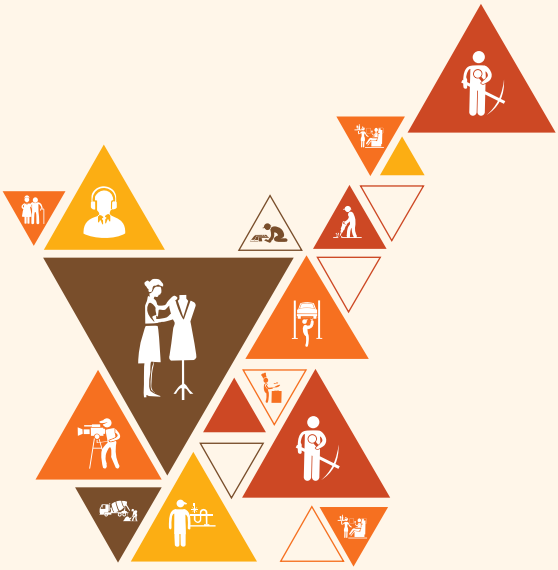
Telecom
Sector
Skill
Council

7. 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:	Optical Fiber Splicer		
Qualification Pack Name & Ref. ID	TEL/Q6400 VERSION 4.0		
Version No.	4.0	**Version Update Date**	30/12/2021
Pre-requisites to Training (if any)	Not Applicable		
Training Outcomes	**By the end of this program, the participants will be able to:** 1. Perform efficient splicing of optical fiber cable 2. Test the effectiveness of the optical fiber 3. Maintain OTDR (Optical Time Domain Reflectometer) register 4. Optimise resources, work efficiently and adhere to safety standards 5. Interact effectively with others while being sensitive to gender and persons with disabilities.		

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
1	**Role and Responsibilities of an Optical Fiber Splicer**	**Introduction to telecom sector**	• Outline the course objectives and outcomes • Analyse the requirements of the course and prepare as per the pre-requisites of the course • Discuss the size and scope of the Telecom industry and Passive Infrastructure sub-sector • Explain the basics of telecom and the terminologies used in the work process	Bridge module	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop with software like MS Office and internet, Whiteboard, Marker, Projector	7 Theory (5:00) Practical (2:00)
		Responsibilities and career progression	• Identify the roles and responsibilities of an Optical Fiber Splicer • Discuss the career progression of an Optical Fiber Splicer in the Telecom industry				7 Theory (5:00) Practical (2:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Scope of work	• Prepare for the role of an Optical fiber splicer by visiting a work site and interacting with others • Prepare a fibre optic technician for splicing				8 Theory (5:00) Practical (3:00)
			• 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				8 Theory (5:00) Practical (3:00)
2	**Prepare for Splicing Operations for New Installation**	**Ensure the availability of tools and spares**	• Explain how to ensure the availability of optical cable test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.) • Discuss ways to confirm the availability of optical equipment (spool, joint closure, connectors, splicer and cleaver) • Use appropriate techniques to check the availability of joint kits, pigtails, patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) connectors, protection sleeves and heat shrink • Elaborate on the process of sending faulty equipment to the logistics team for repair or replacement	TEL/N6400 PC1, PC2, PC3, PC4	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),	8 Theory (4:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Discuss the significance of the availability of RCC (Reinforced Cement Concrete) joint chambers with covers and adequate sand as per specifications • Discuss the importance of the availability of one spare cable drum for the emergency replacement of laid cables • Apply appropriate ways to ensure the calibration status of the equipment to be performed (e.g., splicing machine, OTDR, power meter, cleaver)	TEL/N6400 PC5, PC6, PC7		Joint kits, Pigtails, Patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) Connector, Protection sleeves and Heat shrink, RCC (Reinforced Cement Concrete) joint chambers, Cable drum	8 Theory (4:00) Practical (4:00)
		Prepare cable for splicing for new installation	• Identify exact location and fiber/fiber group for which the splicing is to be done as per network route and connectivity plan • Demonstrate the process to inspect cable for sheath damage visually	TEL/N6400 PC8, PC9			8 Theory (4:00) Practical (4:00)
			• Show how to dismantle/install the fiber joint box/splitter box carefully • Explain the importance of maintaining minimum bend ratios as per manufacturer specifications to prevent cable damage and signal degradation	TEL/N6400 PC10, PC11			8 Theory (4:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Employ appropriate technique to secure cable in accordance with the industry practices to avoid cable and sheath damage • Determine appropriate fibers to be joined based on colour coding and sequence • Identify an appropriate place for the joint chamber location • Show how to clean fiber as per manufacturer specifications	TEL/N6400 PC12, PC13, PC14, PC15			8 Theory (4:00) Practical (4:00)
3	**Maintenance and Splicing of Optical Fiber**	**Carry out maintenance of Optical Fiber Cables**	• Identify the route/ fiber and location where splicing/ maintenance needs to be done in coordination with Fiber Technician / Operation and Maintenance (O&M) team • Explain how to arrange outage exclusion time (maintenance window timeline) for the fiber and route in consultation with O&M team	TEL/N6400 PC16, PC17	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,	7 Theory (2:00) Practical (5:00)
			• Discuss the importance of visiting the site to identify the exact location and fiber/fiber group for which the splicing is to be done • Explain the process to expose the fiber fault point (by digging for trenched fiber, or opening manholes etc., as required	TEL/N6400 PC18, PC19			7 Theory (2:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Show how to inspect cable for sheath damage visually • Demonstrate the steps to dismantle/ install the fiber joint box/splitter box carefully	TEL/N6400 PC20, PC21		Patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) Connector, Protection sleeves and Heat shrink, RCC (Reinforced Cement Concrete) joint chambers, Cable drum	4 Theory (4:00) Practical (4:00)
			• Explain the importance of maintaining minimum bend ratios as per manufacturer specifications to prevent cable damage and signal degradation • Demonstrate the process to secure cable in accordance with the industry practice to avoid cable and sheath damage	TEL/N6400 PC22, PC23			7 Theory (3:00) Practical (4:00)
			• Determine appropriate fibers to be joined based on color coding and sequence • Identify an appropriate place for the joint chamber location • Show how to clean the fiber as per manufacturer specifications	TEL/N6400 PC24, PC25, PC26, KU6			7 Theory (3:00) Practical (4:00)
		Perform splicing operations	• Demonstrate the process to strip cables at areas where splicing has to be performed • Use a precision cleaver to cleave fiber • Illustrate the process to inspect cleaved fiber ends with magnifier to ensure appropriateness	TEL/N6400 PC27, PC28			7 Theory (3:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Show how to insert fiber strands to the fusion machine in accordance with the product/equipment specifications in case of fusion splicing • Demonstrate the process to align fibers together by a precision-made sleeve and place the prepared fiber in mechanical splicing kit in case of mechanical splicing • Use proper splice protectors like heat shrink splice protectors to protect the splice	TEL/N6400 PC29, PC30, PC31, PC32			7 Theory (3:00) Practical (4:00)
4	**Fiber Testing and Documentation**	**Test effectiveness of splice through OTDR and power meter tests**	• Understand the working procedures of OTDR (Optical Time Domain Reflectometer) and Power meter • Illustrate the methods of testing the effectiveness of optical fiber cable using OTDR (Optical Time Domain Reflectometer) • Demonstrate the procedure to test fiber joint with OTDR to check conformance to design requirements	TEL/N6401 PC1, KU2	**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.), Related Standard Operating Procedures (SOPs), Format of various related reports	7 Theory (4:00) Practical (3:00)
			• Demonstrate how to measure optical loss • Elaborate the need and the method/ procedure to measure the optical losses in the optical fiber cable	TEL/N6401 PC2			7 Theory (4:00) Practical (3:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Perform the procedure to seal joint closures through heat shrinking, multi-diameter seals or mechanical seals, as required • Demonstrate the use of FRP (Fiber Reinforced Plastic) to strengthen the joint • Show how to place the joint in the chamber • Demonstrate the procedure to place the spare cable (loop) coiled inside the joint	TEL/N6401 PC3, PC4, PC5, PC6			8 Theory (4:00) Practical (4:00)
			• Conduct power source and power meter tests at both ends of the fiber for instances of cross fiber and ensure their elimination	TEL/N6401 PC7			8 Theory (4:00) Practical (4:00)
			• Demonstrate how to fill sand in the chamber to the brim and place the chamber covers properly • Discuss the significance of planting the joint indicator 1 meter behind the chamber location (away from the road)	TEL/N6401 PC8, PC9			7 Theory (3:00) Practical (4:00)
			• Discuss the significance of correct paint colour of the route indicators (e.g. yellow for joint)	TEL/N6401 PC10			7 Theory (3:00) Practical (4:00)
			• Demonstrate how to remove alignment errors during splicing of optical fibers including errors like Lateral, Axial, Angular and poor end finish	TEL/N6401 PC11			7 Theory (3:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Record test results	• Identify the documents to be updated • Record all jointing test readings and analyse the test result to generate the acceptance report	TEL/N6401 PC12, PC13			8 Theory (3:00) Practical (5:00)
			• Describe OTDR (Optical Time Domain Reflectometer) report generation process • Discuss the standard procedures of reporting and documentation • Explain the importance of adhering to the standards and follow optimal values of OTDR, power meter and light meter for the test results	TEL/N6401 PC14, PC15, KU1, KU3			8 Theory (3:00) Practical (5:00)
		Follow Health and Safety procedures with regards to fiber splicing	• Discuss commonly occurring hazards, like Earth Potential Rise (EPR) while carrying out the work	TEL/N6401 PC16, PC17			8 Theory (3:00) Practical (5:00)
			• Demonstrate the use of use PPE (Personal Protection Equipment) like helmets, knee pads, safety boots, safety glasses and trench guards appropriately	TEL/N6401 PC17, KU6			7 Theory (3:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• State the importance of complying with site risk control, OHS, environmental, quality and legal requirements at all times • Determine environmental conditions and hazards like Earth Potential Rise (EPR) while carrying out the work	TEL/N6401 PC17, PC18, KU4, KU5, KU6, KU7			8 Theory (3:00) Practical (5:00)
5	**Plan Work Effectively, Optimise Resources and Implement Safety Practices**	**Perform work as per quality standards**	• Employ appropriate ways to keep the workspace clean and tidy • Discuss how to perform individual roles and responsibilities as per the job role while taking accountability for the work • Show how to record/ document tasks completed as per the requirements within specific timelines • Perform the steps to implement schedules to ensure the timely completion of tasks • Identify the cause of a problem related to your own work and validate it	TEL/N9101 PC1, PC2, PC3, PC4, PC5, PC6	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	White-board/ blackboard marker / chalk, Duster, Computer or Laptop attached to LCD projector, Personal Protection Equipment: Safety glasses, Head protection, Rubber gloves, Safety footwear,	8 Theory (3:00) Practical (5:00)
		Maintain a safe, healthy and secure working environment Part - 1	• Apply appropriate techniques to analyse problems accurately and communicate different possible solutions to the problem • Discuss how to comply with the organisation's current health, safety, security policies and procedures	TEL/N9101 PC7, PC8, PC9, PC10, PC11, PC12, PC13, PC14		Warning signs and tapes, Fire extinguisher and First aid kit	8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Demonstrate the steps to check for water spills in and around the workspace and escalate these to the appropriate authority • Practice reporting any identified breaches in health, safety, and security policies and procedures to the designated person • Use safety materials such as goggles, gloves, earplugs, caps, ESD pins, covers, shoes, etc. • Apply required precautions to avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence • Identify hazards such as illness, accidents, fires or any other natural calamity safely, as per the organisation's emergency procedures, within the limits of the individual's authority • Explain the importance of regularly participating in fire drills or other safety-related workshops organised by the company • Discuss the significance of reporting any hazard outside the individual's authority to the relevant person in line with organisational procedures and warn others who may be affected				

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Maintain a safe, healthy and secure working environ-ment Part - 2	• Explain how to maintain appropriate posture while sitting/ standing for long hours • Employ appropriate techniques to handle heavy and hazardous materials with care while maintaining an appropriate posture • Discuss the importance of sanitising workstations and equipment regularly • Show how to clean hands with soap and alcohol-based sanitiser regularly • Discuss how to avoid contact with anyone suffering from communicable diseases and take necessary precautions • List the safety precautions to be taken while travelling, e.g., maintain a 1m distance from others, sanitise hands regularly, wear masks, etc. • Role-play a situation to report hygiene and sanitation issues to the appropriate authority • Discuss how to follow recommended personal hygiene and sanitation practices, for example, washing/ sanitising hands, covering the face with a bent elbow while coughing/sneezing, using PPE, etc.	TEL/N9101 PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC22			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Conserve material/ energy / electricity	• Apply appropriate ways to optimise the usage of material, including water, in various tasks/ activities/processes • Use resources such as water, electricity and others responsibly • Demonstrate the steps to carry out routine cleaning of tools, machines and equipment • Apply appropriate ways to optimise the use of electricity/ energy in various tasks/activities/ processes • Perform periodic checks of the functioning of the equipment/machine and rectify wherever required • Explain the significance of reporting malfunctioning and lapses in the maintenance of equipment • Use electrical equipment and appliances properly	TEL/N9101 PC23, PC24, PC25, PC26, PC27, PC28, PC29			8 Theory (3:00) Practical (5:00)
		Use effective waste management / recycling practices	• Identify recyclable, non-recyclable and hazardous waste • Apply appropriate ways to deposit recyclable and reusable material at the identified location • Explain the process to dispose of non-recyclable and hazardous waste as per recommended processes	TEL/N9101 PC30, PC31, PC32			8 Theory (4:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
6	**Communication and interpersonal skills**	**Interact effectively with superiors**	• Explain how to receive work requirements from superiors and customers and interpret them correctly • Role-play a situation to inform the supervisor and/or concerned person about any unforeseen disruptions or delays • Practice participating in decision-making by providing facts and figures, giving/ accepting constructive suggestions • Practice rectifying errors as per feedback and ensure the errors are not repeated	TEL/N9102 PC1, PC2, PC3, PC4	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	White-board and Markers, Chart paper and sketch pens, LCD Projector and Laptop for presentations, Sample of escalation matrix, organisation structure	8 Theory (3:00) Practical (5:00)
		Interact effectively with colleagues and customers Part - 1	• Discuss how to comply with the organisation's policies and procedures for working with team members • Apply appropriate modes of communication, such as face-to-face, telephonic and written, to communicate professionally • Show how to respond to queries and seek/ provide clarifications if required	TEL/N9102 PC5, PC6, PC7			8 Theory (3:00) Practical (5:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Interact effectively with colleagues and customers Part - 2	• Illustrate the process to coordinate with the team to integrate work as per requirements • Discuss how to resolve conflicts within the team/with customers to achieve a smooth workflow • Discuss how to recognise emotions accurately in self and others to build good relationships • prioritise team and organisation goals above personal goals	TEL/N9102 PC8, PC9, PC10, PC11			8 Theory (3:00) Practical (5:00)
		Gender sensitisation	• Explain how to maintain a conducive environment for all genders in the workplace • Discuss ways to encourage appropriate behaviour and conduct with people across gender • Explain how to ensure equal participation of people across genders in discussions	TEL/N9102 PC12, PC13, PC16			8 Theory (3:00) Practical (5:00)
		PwD sensitisation	• Identify ways to assist team members with a disability in overcoming any challenges faced at work • Practice appropriate verbal and non-verbal communication while interacting with People with Disability (PwD)	TEL/N9102 PC14, PC15			8 Theory (4:00) Practical (4:00)

SL	Module Name	Session name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
Total Duration							Theory 120:00 Practical 150:00
On the job training (Training provided by the relevant industry)							120:00
Employability Skills (DGT/VSQ/N0101) (https://eskillindia.org/NewEmployability)							30:00
Total Duration							Theory + Practical + OJT+ ES 420:00

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Optical Fiber Splicer	
Job Role	**Optical Fiber Splicer**
Qualification Pack	**TEL/Q6400 V4.0**
Sector Skill Council	**Telecom Sector Skill Council**

S. No.	Guidelines for Assessment
1	Council. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/ option NOS/set of NOS.
4	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6	To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Assessment Outcomes	Assessment Criteria for Outcomes	Marks Allocation		
		Theory	Skills Practical	
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/N6401: Test Effectiveness and Record Test Results	PC1. test fiber joint with OTDR to check conformance to design requirements	1	3	1
	PC2. keep optical losses (reflectance, return, insertion loss etc.) within the defined specifications	1	2	-
	PC3. seal joint closures through heat shrinking, multi-diameter seals or mechanical seals, as required	1	3	-
	PC4. use FRP (Fiber Reinforced Plastic) to strengthen the joint	2	3	-
	PC5. ensure proper placement of the joint in the chamber	2	3	-

	PC6. ensure the spare cable (loop) is coiled appropriately and placed inside the joint	2	4	-
	PC7. conduct power source and power meter tests at both ends of the fiber for instances of cross fiber and ensure their elimination	2	5	1
	PC8. fill sand in the chamber to the brim and place the chamber covers properly	1	3	-
	PC9. plant the joint indicator 1 meter behind the chamber location (away from the road)	1	2	1
	PC10. ensure correct paint color of the route indicators (e.g. yellow for joint)	1	2	-
	PC11. remove alignment errors during splicing of optical fibers including errors like Lateral, Axial, Angular and poor end finish	1	5	1
	PC12. identify the documents to be updated	1	2	-
	PC13. prepare jointing record for future reference	1	3	1
	PC14. complete the record of jointing tests in OTDR register	1	3	-
	PC15. make documents available to appropriate authorities for inspection	1	2	1
	PC16. ensure sites are assessed for health and safety risks as per industry guidelines before commencement of work	2	4	1
	PC17. use PPE (Personal Protection Equipment) like helmets, knee pads, safety boots, safety glasses and trench guards appropriately	2	4	1
	PC18. comply with site risk control, OHS, environmental, quality and legal requirements at all times	3	4	1
	PC19. determine environmental conditions and hazards like Earth Potential Rise (EPR) while carrying out the work	4	3	1
	NOS Total	**30**	**60**	**10**
TEL/N9101: Organise Work and Resources as per Health and Safety Standards	PC1. keep workspace clean and tidy	-	1	-
	PC2. perform individual role and responsibilities as per the job role while taking accountability for the work	1	1	1
	PC3. record/document tasks completed as per the requirements within specific timelines	-	1	1
	PC4. implement schedules to ensure timely completion of tasks	-	2	-
	PC5. identify the cause of a problem related to own work and validate it	2	2	-
	PC6. analyse problems accurately and communicate different possible solutions to the problem	1	2	-
	PC7. comply with organisation's current health, safety, security policies and procedures	1	1	-
	PC8. check for water spills in and around the work space and escalate these to the appropriate authority	1	2	1
	PC9. report any identified breaches in health, safety, and security policies and procedures to the designated person	1	2	1
	PC10. use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.	1	2	1
	PC11. avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence	2	3	1
	PC12. identify hazards such as illness, accidents, fires or any other natural calamity safely, as per organisation's emergency procedures, within the limits of individual's authority	2	1	-

	PC13. participate regularly in fire drills or other safety related workshops organised by the company	1	3	-
	PC14. report any hazard outside the individual's authority to the relevant person in line with organisational procedures and warn others who may be affected	1	3	-
	PC15. maintain appropriate posture while sitting/standing for long hours	1	1	-
	PC16. handle heavy and hazardous materials with care, while maintaining appropriate posture	1	1	-
	PC17. sanitize workstation and equipment regularly	1	2	-
	PC18. clean hands with soap, alcohol-based sanitizer regularly	-	1	-
	PC19. avoid contact with anyone suffering from communicable diseases and take necessary precautions	-	1	-
	PC20. take safety precautions while travelling e.g. maintain 1m distance from others, sanitize hands regularly, wear masks, etc.	1	2	-
	PC21. report hygiene and sanitation issues to appropriate authority	1	1	-
	PC22. follow recommended personal hygiene and sanitation practices, for example, washing/sanitizing hands, covering face with a bent elbow while coughing/sneezing, using PPE, etc.	1	1	-
	PC23. optimize usage of material including water in various tasks/ activities/processes	1	2	-
	PC24. use resources such as water, electricity and others responsibly	1	2	1
	PC25. carry out routine cleaning of tools, machine and equipment	1	2	-
	PC26. optimize use of electricity/energy in various tasks/activities/ processes	1	3	1
	PC27. perform periodic checks of the functioning of the equipment/ machine and rectify wherever required	1	3	1
	PC28. report malfunctioning and lapses in maintenance of equipment	1	2	-
	PC29. use electrical equipment and appliances properly	1	2	-
	PC30. identify recyclable, non-recyclable and hazardous waste	1	2	1
	PC31. deposit recyclable and reusable material at identified location	1	3	-
	PC32. dispose non-recyclable and hazardous waste as per recommended processes	1	3	-
	NOS Total	**30**	**60**	**10**
TEL/N9102: Interact Effectively with Team Members and Customers	PC1. receive work requirements from superiors and customers and interpret them correctly	1	2	-
	PC2. inform the supervisor and/or concerned person about any unforeseen disruptions or delays	2	4	1
	PC3. participate in decision making by providing facts and figures, giving/ accepting constructive suggestions	2	5	1
	PC4. rectify errors as per feedback and ensure the errors are not repeated	2	4	-
	PC5. comply with organisation's policies and procedures for working with team members	1	2	-
	PC6. communicate professionally using appropriate mode of communication such as face-to-face, telephonic and written	2	4	1
	PC7. respond to queries and seek/provide clarifications if required	2	4	1
	PC8. co-ordinate with team to integrate work as per requirements	-	3	-
	PC9. resolve conflicts within the team/with customers to achieve smooth workflow	1	5	1

	PC10. recognize emotions accurately in self and others to build good relationships	1	4	-
	PC11. prioritize team and organization goals above personal goals	-	4	1
	PC12. maintain a conducive environment for all the genders at the workplace	2	5	1
	PC13. encourage appropriate behavior and conduct with people across gender	2	5	1
	PC14. assist team members with disability in overcoming any challenges faced in work	3	4	1
	PC15. practice appropriate verbal and non-verbal communication while interacting with People with Disability (PwD)	2	4	1
	PC16. ensure equal participation of the people across genders in discussions	2	6	-
	NOS Total	**25**	**65**	**10**
DGT/VSQ/N0101: Employability Skills (30 Hours)	Introduction to Employability Skills	1	1	-
	PC1. understand the significance of employability skills in meeting the jobrequirements	-	-	-
	Constitutional values – Citizenship	1	1	-
	PC2. identify constitutional values, civic rights,duties, personal values and ethics and environmentally sustainable practices	-	-	-
	Becoming a Professional in the 21st Century	1	3	-
	PC3. explain 21st Century Skills such as Self- Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and culturalawareness, emotional awareness, continuous learning mindset etc.	-	-	-
	Basic English Skills	2	3	-
	PC4. speak with others using some basic English phrases or sentences	-	-	-
	Communication Skills	1	1	-
	PC5. follow good manners while communicatingwith others	-	-	-
	PC6. work with others in a team	-	-	-
	Diversity & Inclusion	1	1	-
	PC7. communicate and behave appropriatelywith all genders and PwD	-	-	-
	PC8. report any issues related to sexualharassment	-	-	-
	Financial and Legal Literacy	3	4	-
	PC9. use various financial products and servicessafely and securely	-	-	-
	PC10. calculate income, expenses, savings etc.	-	-	-
	PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-
	Essential Digital Skills	4	6	-
	PC12. operate digital devices and use its features and applications securely and safely	-	-	-
	PC13. use internet and social media platforms securely and safely	-	-	-
	Entrepreneurship	3	5	-
	PC14. identify and assess opportunities for potential business	-	-	-
	PC15. identify sources for arranging money andassociated financial and legal challenges	-	-	-
	Customer Service	2	2	-

	PC16. identify different types of customers	-	-	-
	PC17. identify customer needs and address them appropriately	-	-	-
	PC18. follow appropriate hygiene and groomingstandards	-	-	-
	Getting ready for apprenticeship & Jobs	1	3	-
	PC19. create a basic biodata	-	-	-
	PC20. search for suitable jobs and apply	-	-	-
	PC21. identify and register apprenticeship opportunities as per requirement	-	-	-
	NOS Total	**20**	**30**	**-**

Annexure III

List of QR Codes Used in PHB

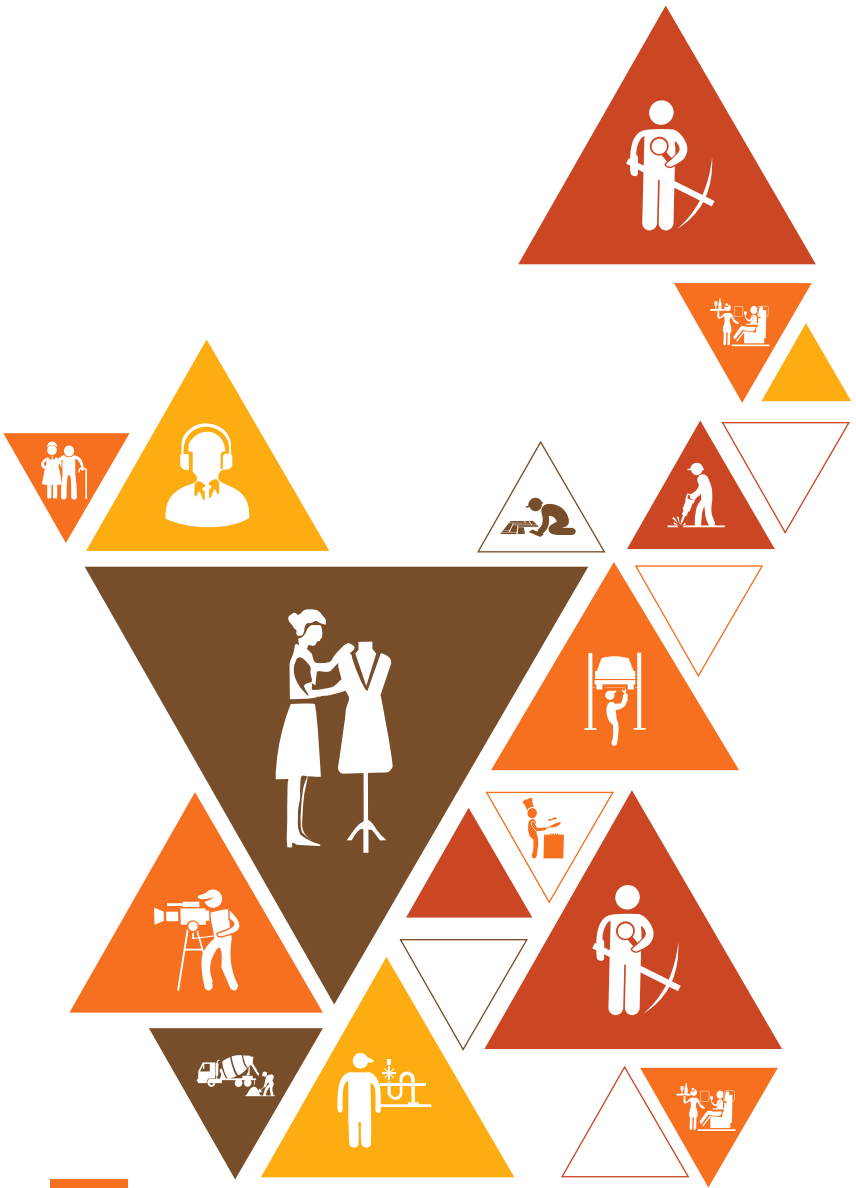
Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
Module 1: Introduction to the Tele-com Sector and the Role of Optical Fibre Splicer	UNIT - 1.2: Tele-com Sec-tor in India	1.2.1 Introduc-tion to Telecom Industry	19	https://youtu.be/Cag-bcbivtM	Introduction to Telecom Indus-try
		1.2.3 Broad Band Industry	19	https://www.youtube.com/watch?v=5SoTmES2UKM	Broad Band Industry
		1.2.4 Optical Fibre Technology	19	https://www.youtube.com/watch?v=jZOg39v73c4	Optical Fibre Technology
		1.2.5 Types of Optical Fibre	19	https://www.youtube.com/watch?v=pavBq7HIoIE	Types of Optical Fibre
		1.2.6 Optical Fibre Splicer	19	https://www.youtube.com/watch?v=d-xth2HzVYU	Optical Fibre Splicer

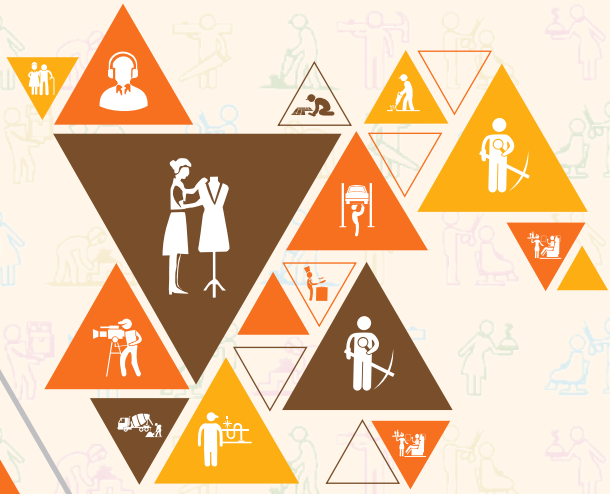
Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
	UNIT - 1.3: Tele-com Basics	1.3.1 Basics of Telecom	19	https://www.youtube.com/watch?v=xRFe9jWY0hg	Basics of Tele-com
Module 2: Prepare for Splicing Operations for New Installation	UNIT - 2.1 Manage tools and spares	2.1.1 Characteristics of Optical Fibre	52	https://www.youtube.com/watch?v=G-UyeFDsXlI	Characteristics of Optical Fibre
		2.1.2 Various Optical Equipment	52	https://www.youtube.com/watch?v=SDPfA8k0dUc	Various Optical Equipment
	UNIT - 2.2 Pre-Installation Procedures	2.2.1 Specifications of Fibre Optic Cable	52	https://www.youtube.com/watch?v=77dOO5hvd58	Specifications of Fibre Optic Cable
		2.2.3 Factors Affecting Choosing of Cables	52	https://www.youtube.com/watch?v=1oYYB7AGeMo	Factors Affecting Choosing of Cables

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
		2.2.6 Colour Coding of Optical Fibre Cable	52	https://www.youtube.com/watch?v=eCpujviAo9g	Colour Coding of Optical Fibre Cable
	UNIT - 2.3 Installation of Optical Fibre	2.2.1 Installing OFC	52	https://www.youtube.com/watch?v=fYwBgqDdLLQ	Installing OFC
Module 3: Maintenance and Splicing of Optical Fibre	UNIT - 3.1: Optical Fibre Splicing	3.1.1 Splicing of OFC	73	https://www.youtube.com/watch?v=xba2MThR9Ls	Splicing of OFC
		3.1.2 Types of Optical Fibre Splicing	73	https://www.youtube.com/watch?v=rr9hHjYRbw8	Types of Optical Fibre Splicing
Module 4: Fibre Testing and Doc-umenta-tion	UNIT - 4.1: Test-ing Optical Fibre Cable	4.1.1 OTDR (Opti-cal Time-Domain Reflectometer)	89	https://www.youtube.com/watch?v=tXWa3xFUVGA	OTDR (Optical Time-Domain Reflectometer)
5. Organize Work and Resources as per Health and Safety Standards	UNIT 5.2: Dif-ferent Types of Health Hazards	5.1.2 First Aid Techniques	90	https://www.youtube.com/watch?v=GrxevjEvk_s	First Aid at Work Place

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
	UNIT 5.3: Importance of Safe Working Practices	5.3.1 Basic Hygiene Practices	90	https://youtu.be/IsgLivAD2FE	How to properly wash your hands
	UNIT 5.3: Importance of Safe Working Practices	5.3.3 Safe Workplace Practices	90	https://youtu.be/qzdLmL4Er9E	How to give CPR to an Adult, a Child or an infant
	UNIT 5.5: time Management	5.5.6 Escalation Matrix	90	https://www.youtube.com/watch?v=ccAZ9nCZSLc	Escalation Matrix PowerPoint Presentation Slides
	UNIT 5.9: Waste Management	5.9.6 E-waste Management Process	90	https://www.youtube.com/watch?v=dq7bBZUFR14	E-Waste Recycling and Management
6. Communication and Interpersonal Skills	UNIT 6.1: Interaction with Supervisor, Peers and Customers	6.1.3 Effective Communication	106	https://youtu.be/8v60jWtecrQ	Effective Telephone Tips from Successfully Speaking

Module No.	Unit No.	Topic Name	Page No. in PHB	Link for QR Code (s)	QR code (s)
	UNIT 6.1: Interaction with Supervisor, Peers and Customers	6.1.5 Types of Communication	106	https://www.youtube.com/watch?v=K5qQ77cmNPs	Types of Communication?
	UNIT 6.1: Interaction with Supervisor, Peers and Customers	6.1.8 Communication with Colleagues & Customers	106	https://www.youtube.com/watch?v=wnzwgExFRR4	Communication with Customer and Colleagues
Employability Skills				https://www.skillindiadigital.gov.in/content/list	





Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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

Scan/Click this QR Code to access eBook

Telecom
Sector
Skill
Council

Address: **Telecom Sector Skill Council of India**
Estel House, 3rd Floor, Plot No:- 126, Sector 44
Gurugram, Haryana 122003
Email: tssc@tsscindia.com
Web: www.tsscindia.com
Phone: 0124-2222222

Price: ₹