Model Curriculum

QP Name: Optical Fiber Splicer

QP Code: TEL/Q6400

QP Version: 2.0

NSQF Level: 3

Model Curriculum Version: 1.0

Telecom Sector Skill Council || Telecom Sector Skill Council, 3rd Floor, Plot No. 126, Sector - 44 Gurgaon – 122003

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Training Parameters

Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance – Passive Infrastructure
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7422.0802
Minimum Educational Qualification and Experience	Class 10th **OR** Class 8th with 1-year relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	15 Years
Last Reviewed On	30/12/2021
Next Review Date	30/12/2024
NSQC Approval Date	30/12/2021
QP Version	2.0
Model Curriculum Creation Date	30/09/2021
Model Curriculum Valid Up to Date	30/12/2024
Model Curriculum Version	1.0
Minimum Duration of the Course	390 Hours, 0 Minutes
Maximum Duration of the Course	390 Hours, 0 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner will be able to:

- Perform efficient splicing of optical fiber cable
- Test effectiveness of the optical fiber
- Maintain OTDR (Optical Time Domain Reflectometer) register
- Optimize resources, work efficiently and adhere to safety standards
- Interact effectively with others while being sensitive of gender and persons with disabilities

Compulsory Modules

The table lists the modules, their duration and mode of delivery.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**04:00**	**00:00**	**00:00**	**00:00**	**04:00**
Module 1: Role and Responsibilities of an Optical Fiber Splicer	04:00	00:00	00:00	00:00	04:00
TEL/N6400– Splice Optical Fiber **NOS Version No. 2.0** **NSQF Level 3**	**44:00**	**58:00**	**60:00**	**00:00**	**162:00**
Module 2: Prepare for Splicing Operations for New Installation	20:00	24:00	30:00	00:00	74:00
Module 3: Maintenance and Splicing of Optical Fiber	24:00	34:00	30:00	00:00	88:00
TEL/N6401– Test Effectiveness and Record Test Results **NOS Version No. 2.0** **NSQF Level 3**	**40:00**	**44:00**	**60:00**	**00:00**	**144:00**
Module 4: Fiber Testing and Documentation	40:00	44:00	60:00	00:00	144:00
TEL/N9101- Organize Work and Resources as Per Health and Safety Standard **NOS Version No. 1.0**	**16:00**	**24:00**	**00:00**	**00:00**	**40:00**

NSQF Level 4					
Module 5: Plan Work Effectively, Optimise Resources and Implement Safety Practices	16:00	24:00	00:00	00:00	40:00
TEL/N9102 – Interact effectively with Team Members and Customers **NOS Version No. 1.0** **NSQF Level 4**	**16:00**	**24:00**	**00:00**	**00:00**	**40:00**
Module 6: Communication and Interpersonal Skills	16:00	24:00	00:00	00:00	40:00
Total Duration	**120:00**	**150:00**	**120:00**	**00:00**	**390:00**

Module Details

Module 1: Role and Responsibilities of an Optical Fiber Splicer

Mapped to Bridge Module

Terminal Outcomes:

- Describe the role and responsibilities of an Optical Fiber Splicer
- Explain the scope of work for an Optical Fiber Splicer

Duration: *04:00*	**Duration**: *00:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the size and scope of the Telecom industry and Passive Infrastructure sub-sector • Outline the course objectives and outcomes • Identify the roles and responsibilities of an Optical Fiber Splicer • Discuss the career progression of an Optical Fiber Splicer in the Telecom industry • Explain the basics of telecom and the terminologies used in the work process	• NA
Classroom Aids	
Whiteboard, Markers, Duster, Projector, Laptop, Presentation	
Tools, Equipment and Other Requirements	
NA	

Module 2: Prepare for Splicing Operations for New Installation

Mapped to TEL/N6400, v2.0

Terminal Outcomes:

- Manage tools and spares
- Prepare the cable for splicing for new installation

Duration: *20:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the characteristics of Optical Fiber, (like refraction, polarization, attenuation, dispersion, etc.) • Explain the uses of various optical equipment (spool, joint closure, connectors, splicer and cleaver), optical test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.), and other tools and equipment, like joint kits, pigtails, patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) connector, protection sleeves and heat shrink, etc. • Describe fault analysis procedures and safety measures for different tools and mechanical equipment • Discuss the importance of calibrating the test equipment • Explain the color coding of optical fiber cable • Discuss the steps of preparing the cable for splicing for new installation	• Identify the tools and equipment required for optical fiber splicing Demonstrate the operations of various tools and equipment required for optical fiber splicing • Inspect Optical Time Domain Reflectometer (OTDR), Power Meter, Joint Closure, Connectors, Splicer, Cleaver, and other mechanical tools/equipment for any fault and calibration status • Employ appropriate practices to find out sheath damage in the cable and secure the cable to avoid the damage • Demonstrate the steps to prepare the cable for splicing for new installation
Classroom Aids	
Training kit (Trainer guide, Presentations), Whiteboard, Markers, Duster, Computer, Projector, Participant Handbook	
Tools, Equipment and Other Requirements	
Optical cable test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.), Optical equipment (Spool, Joint closure, Connectors, Splicer and Cleaver), Joint kits, Pigtails, Patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) Connector, Protection sleeves and Heat shrink, RCC (Reinforced Cement Concrete) joint chambers, Cable drum	

Module 3: Maintenance and Splicing of Optical Fiber

Mapped to TEL/N6400, v2.0

Terminal Outcomes:

- Perform maintenance activities of the laid optical fiber
- Complete fiber splicing operations for new installation

Duration: *24:00*	**Duration**: *34:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the principles of optical transport media • Discuss signal strength and quality KPIs of optical fiber cables • Explain the processes of preventive maintenance of the laid optical fiber cables • Interpret the standard operating procedures while performing preventive maintenance of the laid optical fiber cables • Describe the procedures of sealing joints, heat shrinking/multi-diameter seals/mechanical seals, etc. • Elaborate the optical fiber splicing process • Discuss commonly occurring alignment errors, like Axial, Angular and Poor end finish and the ways to avoid these • List the do's and don'ts while performing splicing operations	• Perform regular maintenance activities for the laid fiber cable • Perform sealing joint closure heat shrinking/multi-diameter seals/mechanical seals, etc. • Demonstrate splicing the optical fiber • Draft a sample report to escalate any fault or issues to the Supervisor
Classroom Aids	
Training kit (Trainer guide, Presentations), Whiteboard, Markers, Duster, Computer, Projector, Participant Handbook	
Tools, Equipment and Other Requirements	
Optical cable test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.), Optical equipment (Spool, Joint closure, Connectors, Splicer and Cleaver), Joint kits, Pigtails, Patch cords, FDF (Fiber Distribution Frame), ODB (Optical Distribution Box) Connector, Protection sleeves and Heat shrink, RCC (Reinforced Cement Concrete) joint chambers, Cable drum	

Module 4: Fiber Testing and Documentation

Mapped to TEL/N6401, v2.0

Terminal Outcomes:

- Perform the activities to test effectiveness of spliced optical fiber
- Maintain OTDR (Optical Time Domain Reflectometer) register

Duration: *40:00*	**Duration**: *44:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Understand the working procedures of OTDR (Optical Time Domain Reflectometer) and Power meter • Discuss the methods of testing the effectiveness of optical fiber cable using OTDR (Optical Time Domain Reflectometer) • Elaborate the need and the method/procedure to measure the optical losses in the optical fiber cable • Discuss how to interpret the test result to localize faults and measure optical losses • Explain the importance of adhering to the standards and follow optimal values of OTDR, power meter and light meter for the test results • Discuss commonly occurring hazards, like Earth Potential Rise (EPR) while carrying out the work • Describe OTDR (Optical Time Domain Reflectometer) report generation process • Discuss the standard procedures of reporting and documentation	• Perform various test to verify the quality of installation • Demonstrate how to measure optical loss • Perform the procedure of trouble shooting of optical fiber • Record all jointing test readings and analyse the test result to generate the acceptance report • Perform the procedure to generate a sample report using the results/findings in proper formats
Classroom Aids	
Training kit (Trainer guide, Presentations), Whiteboard, Markers, Duster, Computer, Projector, Participant Handbook	
Tools, Equipment and Other Requirements	
Optical cable test equipment (Optical Time Domain Reflectometer (OTDR), power meter, etc.), Related Standard Operating Procedures (SOPs), Format of various related reports	

Module 5: Plan Work Effectively, Optimise Resources and Implement Safety Practices

Mapped to TEL/N9101, v1.0

Terminal Outcomes:

- Explain how to plan work effectively, implement safety practices and optimise use of resources.

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the recent skills and technologies prevalent in the telecom industry. • Discuss the commonly occurring problems with their causes and solutions. • State the importance of keeping the workplace clean, safe and tidy. • List different types of hazards and the procedure to report it to the supervisor. • List the precautionary steps one needs to follow while handling hazardous materials. • State the importance of participating in fire drills and other safety workshops. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol-based hand sanitizers. • List the different methods of cleaning, disinfection, sanitization, etc. • Discuss the importance of self-quarantine or self-isolation. • Explain the path of disease transmission. • Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps, if any. • Explain the ways to optimize usage of resources. • Discuss various methods of waste management and disposal. • List the different categories of waste for the purpose of segregation. • Differentiate between recyclable and non-recyclable waste. • State the importance of using appropriate color dustbins for different types of waste. • Discuss the common sources of pollution and ways to minimize it.	• Prepare a time schedule to complete the tasks on the given time. • Demonstrate the use of safety equipment such as goggles, gloves, ear plugs, shoes, etc. • Demonstrate the correct postures while working and handling hazardous materials at the workplace. • Demonstrate how to evacuate the workplace in case of an emergency. • Show how to sanitize and disinfect one's work area regularly. • Demonstrate the correct way of washing hands using soap and water. • Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs. • Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Demonstrate warning labels, symbols and other related signages. • Perform basic checks to identify any spills and leaks and that need to be plugged /Stopped. • Demonstrate different disposal techniques depending upon different types of waste. • Employ different ways to clean and check if equipment/machines are functioning as per requirements and report malfunctioning, if observed. • Demonstrate ways for efficient utilization of material and water.
Classroom Aids	

White board/ black board marker / chalk, Duster, Computer or Laptop attached to LCD projector
Tools, Equipment and Other Requirements
Personal Protection Equipment: Safety glasses, Head protection, Rubber gloves, Safety footwear, Warning signs and tapes, Fire extinguisher and First aid kit

Module 6: Communication and Interpersonal Skills

Mapped to TEL/N9102, v1.0

Terminal Outcomes:

- Discuss how to communicate effectively and develop interpersonal skills
- Explain the importance of developing sensitivity towards differently abled people

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the importance of following the standard operating procedures of the company w.r.t. priority, confidentiality and security • Outline the organizational structure to receive work instruction and report issues to the supervisor • Discuss the importance of having timely discussions with all genders to avoid repeated errors • State the importance of coordinating and resolving conflicts with the team members to achieve smooth work flow • Discuss about the different types of disabilities with their respective issues • State the work ethics, workplace etiquettes as well as standards and guidelines for all genders and PwD • List health and safety requirements for persons with disability • Describe the rights, duties and benefits available at workplace for person with disability • Explain the process of recruiting people with disability for a specific job • Discuss the specific ways to help people with disability to overcome the challenges	• Use different modes of communication as per requirement and need • Prepare a sample report of the commonly occurring errors and their solutions • Use inclusive language irrespective of the gender/ disability of the person • Demonstrate appropriate behaviour towards all genders and differently abled people • Prepare a list of institutes and government schemes that help PwD in overcoming challenges • Demonstrate the ideal behaviour with a PwD in an organization
Classroom Aids	
Whiteboard and Markers, Chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure	

Module 7: On-the-Job Training

Mapped to Optical Fiber Splicer

Mandatory Duration: *120:00*	**Recommended Duration**: *00:00*
Location: On-Site	
Terminal Outcomes 1. Collect the tools and equipment required for optical fiber splicing from the store. 2. Perform the operations using various tools and equipment as per splicing SOPs. 3. Check the Optical Time Domain Reflectometer (OTDR), Power Meter, Joint Closure, Connectors, etc. to identify and fix any fault and calibration status. 4. Identify any sheath damage or wear-tear in the cable. 5. Protect the cable from any damages. 6. Prepare the cable for splicing at new installation site. 7. Demonstrate how to conduct periodic and corrective maintenance of the fiber cable. 8. Ensure that the sealing joint are properly closed. 9. Check that the joints are protected from heat shrinking and other such issues. 10. Perform the steps for splicing the optical fiber. 11. Prepare a report to inform the supervisor about any faults or issues. 12. Test the installation and joints to verify the quality of installation. 13. Measure optical loss for the installation using appropriate tools and equipment. 14. Troubleshoot any issues in the optical fiber. 15. Perform various other tests to ensure the correct and proper functioning and installation of cable. 16. Record test readings and the test results to generate the acceptance report to be shared with the supervisor. 17. Prepare a report to record the results/findings in proper formats. 18. Ensure that all SOPs and safety measures have been followed during slicing and installation. 19. Clean and clear the site for debris or any other cables/joint parts. 20. Check that all installed cables and joints are properly secured after site cleaning and closure.	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Class 12th **OR** Class 10th + ITI **OR** Diploma	Science/Electronics/ Telecom/IT and other relevant fields	1	Optical Fiber Domain	0	NA	Eligible for ToT program

Trainer Certification	
Domain Certification	**Platform Certification**
Job Role: "Optical Fiber Splicer Level 3" "TEL/Q6400 v2.0", Minimum accepted score is 80%	Job Role: "Trainer", "MEP/Q2601 v1.0", Minimum accepted score is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Class 12th **OR** Class 10th + ITI **OR** Diploma	Science/Electronics/ Telecom/IT and other relevant fields	1	Optical Fiber Domain	0	NA	Eligible for ToA Program

Assessor Certification	
Domain Certification	**Platform Certification**
Job Role: "Optical Fiber Splicer Level 3" "TEL/Q6400, v2.0", Minimum accepted score is 80%	Job Role: "Assessor" "MEP/Q2701 v1.0", Minimum accepted score is 80%

Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the learner on the required competencies of the program.

1. Assessment System Overview:
    - Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
    - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
    - Assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records

2. Testing Environment:
    - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
    - Check the duration of the training.
    - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
    - If the batch size is more than 30, then there should be 2 Assessors.
    - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
    - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
    - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
    - Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:
    - Question papers created by the Subject Matter Experts (SME)
    - Question papers created by the SME verified by the other subject Matter Experts
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
    - Assessor must be ToA certified & trainer must be ToT Certified
    - Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Center photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
AC	Air Conditioner
DG	Diesel Generator
PIU	Power Interface Unit
SMPS	Switch Mode Power Supply
BB	Battery Bank
IPMS	Integrated Power Management System
OPCO	Operating Company
PM	Preventive Maintenance
OPEX	Operating Expenditure
PPE	Personal Protective Equipment
RCA	Root Cause Analysis
PwD	Persons with Disabilities
CRM	Customer Relationship Management
EB	Electricity Board
RFS	Radio Frequency Services
NOC	Network Operating Centre
SRN	Service Request Number