Model Curriculum

QP Name: Optical Fiber Splicer

QP Code: TEL/Q6400

Version: 5.0

NSQF Level: 3.0

Model Curriculum Version: 5.0

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Training Parameters

Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
Country	India
NSQF Level	3.0
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7422.0802
Minimum Educational Qualification and Experience	Grade 10 OR 8th grade pass with 3 years of experience in the operations and maintenance of passive infrastructure OR Previous relevant qualification of NSQF Level 2.5 with 1.5 years of experience in the operations and maintenance of passive infrastructure
Pre-Requisite License or Training	NA
Minimum Job Entry Age	NA
Last Reviewed On	08-05-2025
Next Review Date	30-04-2028
NSQC Approval Date	08-05-2025
QP Version	5.0
Model Curriculum Creation Date	09-03-2025
Model Curriculum Valid Up to Date	30-04-2028
Model Curriculum Version	5.0
Minimum Duration of the Course	390 Hours
Maximum Duration of the Course	390 Hours

Program Overview

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

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- Explain the process of splicing optical fiber and its significance in network reliability.
- Describe the methods used to test the effectiveness of a spliced optical fiber and how results are recorded.
- Discuss the importance of organizing work and resources as per health and safety standards in fiber splicing operations.
- Discuss the relevant Employability and Entrepreneurship Skills.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration (Hours)	Practical Duration (Hours)	On-the-Job Training Duration (Mandatory) (Hours)	On-the-Job Training Duration (Recommended) (Hours)	Total Duration (Hours)
TEL/N6400: Splice Optical Fiber **NOS Version No.: 7.0** **NSQF Level: 3.0**	**30:00**	**60:00**	**60:00**	**00:00**	**150:00**
Module 1: Introduction to the sector and the job role of an Optical Fiber Splicer	05:00	00:00	00:00	00:00	05:00
Module 2: Splicing Optical Fiber	25:00	60:00	60:00	00:00	145:00
TEL/N6401: Test Effectiveness and Record Test Results **NOS Version No.: 4.0** **NSQF Level: 3.0**	**60:00**	**60:00**	**90:00**	**00:00**	**210:00**
Module 3: Testing and Recording Spliced Optical Fiber Performance	50:00	40:00	60:00	00:00	150:00
Module 4: Health, Safety, and Sustainable Practices in Fiber Splicing	10:00	20:00	30:00	00:00	60:00
DGT/VSQ/N0101: Employability Skills (30 Hours) **NOS Version No.: 1.0** **NSQF Level: 2**	**30:00**	**00:00**	**00:00**	**00:00**	**30:00**

Module 5: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	**120:00**	**120:00**	**150:00**	**00:00**	**390:00**

Module Details

Module 1: Introduction to the sector and the job role of an Optical Fiber Splicer
Mapped to TEL/N6400, v7.0

Terminal Outcomes:

- Explain the importance of Telecom Sector.
- Discuss the role and responsibilities of an Optical Fiber Splicer.

Duration (in hours): 05:00	Duration (in hours): 00:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain the significance of the telecom sector in modern communication and economic development. - Elucidate the key skills and technical expertise required for an Optical Fiber Splicer. - Describe the challenges faced in optical fiber Splicing. - Determine the impact of fiber optic technology on internet speed and connectivity. - Discuss the roles and responsibilities of an Optical Fiber Splicer.	
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Nil	

Module 2: Splicing Optical Fiber

Mapped to TEL/N6400, v7.0

Terminal Outcomes:

- Explain how to check the availability of tools, spares, and advanced equipment for fiber optic installations.
- Describe the process of preparing cables for splicing in new installations.
- Discuss how to maintain and troubleshoot laid Optical Fiber Cables (OFCs).
- Elucidate the steps involved in performing advanced splicing operations with automation and precision.
- Describe how to utilize advanced fiber testing tools and document the results.
- Explain the specialized splicing techniques used for micro and nano fibers.

Duration (in hours): 25:00	Duration (in hours): 60:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the structure, types, and materials of optical fibers, including core, cladding, and jacket properties, as well as the optical properties like attenuation, dispersion, and wavelength. • Discuss the basic physics of light transmission in optical fibers and how it relates to signal performance. • Elucidate the different splicing techniques (mechanical, fusion, twist, etc.), their applications, and best practices for minimizing splice loss and ensuring joint durability. • Describe the tools and equipment used for splicing, including fusion splicers, inspection tools, smart cleavers, and safety equipment, along with the proper handling of splicing consumables. • Explain the advanced characteristics of optical fibers and the features and functions of advanced splicing machines and testing equipment. • Discuss the techniques for splicing in challenging environments like outdoor, submarine, or underground networks, and how to mitigate environmental effects on fiber and splice joints. • Describe the use of fiber pigtails, connectorized fiber, routing inside junction	• Demonstrate how to check the availability and functionality of advanced optical testing tools such as OTDR, power meter, OSA, CD analyzer, and PMD analyzer. • Show how to check for availability and manage advanced splicing tools, including automated splicers, robotic arms, cleavers, and inspection tools. • Demonstrate how to manage splicing consumables like joint kits, connectors, heat shrink sleeves, and fiber optic enclosures. • Show how to ensure that splicing machines and testing equipment are calibrated and updated to meet precision standards, and coordinate repair or replacement of faulty tools. • Demonstrate how to locate and identify fibers for splicing using automated mapping tools and network plans, while checking for physical damage with advanced inspection tools. • Show how to prepare optical fibers for splicing by removing jackets, cleaning cores with automated systems, and securing cables within bend radius and stress limits. • Demonstrate how to install joint closures, splitters, and pigtails with weatherproofing, route connectorized fibers, and document compliance with network plans.

boxes, and the various fiber jointing techniques.

- Explain the role of AI-powered tools for fault detection, predictive maintenance, and optimization in fiber networks.

- Discuss the integration of splicing tasks with IoT-enabled smart network management systems and the principles of cloud-based systems for remote monitoring, reporting, and troubleshooting.

- Describe the regulatory compliance practices for optical fiber installation and maintenance, and how they affect network planning and design.

- Elucidate the advanced fusion splicing process, including fiber preparation, splicing machine operation, and ribbon fiber splicing techniques.

- Discuss the proper use of splice closures (heat shrink vs. cold shrink) and sealing techniques for weatherproofing in various environments.

- Explain the techniques and applications of crimp splicing, particularly in hybrid networks.

- Describe the basics of AI-driven predictive maintenance tools used to monitor and optimize fiber networks.

- Show how to identify fiber faults using OTDR, robotic arms, OFIs, and smart cleavers for maintenance in challenging environments.

- Demonstrate how to coordinate with NOC for outage windows, perform fault inspections for microbends and environmental wear, clean fibers, replace damaged sections, re-splice fibers, and ensure proper weatherproofing of cables.

- Demonstrate how to operate fusion splicing machines with automation to minimize errors, and perform various splicing methods (mechanical, fusion, ribbon, etc.) for different applications.

- Show how to ensure splice quality using real-time diagnostics, precision cleavers, and advanced imaging tools, while sealing splices with heat-shrink or cold-shrink closures for protection.

- Demonstrate how to perform micro and nano fiber splicing using specialized tools and document splicing details digitally.

- Show how to use AI-enabled OTDR for fault detection and accurate loss measurement, and test signal quality with tools like OSA, CD analyzer, and PMD analyzer.

- Demonstrate how to verify performance KPIs, generate automated reports for monitoring and compliance, and maintain documentation for network optimization.

Classroom Aids
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films

Tools, Equipment and Other Requirements
Tweezers, Splices, OTDR, Mechanical Splicer, Fusion Splicer (Splicing Machine), Fiber Optic Test Source, Fiber Optic Stripper, Fiber Optic Power Meter, Connectors, Connector Crimper, Cleaver, Cable Jacket Stripper, Cable Cutter, Cable Splitter, Personal Protection Equipment: Hand Gloves, Safety Glasses, Head Protection, Warning Signs and Tapes.

Module 3: Testing and Recording Spliced Optical Fiber Performance

Mapped to TEL/N6401, v4.0

Terminal Outcomes:

- Explain how advanced tools are used to test the effectiveness of a fiber splice.
- Describe the process of recording test results for traceability and performance analysis in fiber splicing.

Duration (in hours): 50:00	Duration (in hours): 40:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain the procedures for documentation, reporting, and record-keeping as per company policies. - Discuss the protocols for testing optical fiber and ensuring quality assurance. - Describe the functions and applications of advanced optical testing tools, including AI-enabled OTDR and power meters. - Elucidate the techniques for sealing and protecting splice closures using heat shrinking and multi-diameter seals. - Determine the threshold values for optical losses and how to mitigate them effectively. - Explain the concept of predictive maintenance and the role of AI-driven tools in minimizing downtime. - Discuss the risks associated with improper testing or splicing, including long-term impacts on network reliability.	- Demonstrate how to use AI-enabled OTDR to analyze splice joints, diagnose faults, and ensure conformance to design specifications. - Show how to ensure optical losses (e.g., reflectance, return, insertion losses) remain within acceptable thresholds. - Demonstrate the process of sealing joint closures using heat shrinking, multi-diameter seals, or mechanical seals to protect against adverse environmental conditions. - Show how to strengthen splices using appropriate reinforcement materials like Fiber Reinforced Plastic (FRP). - Demonstrate power source and power meter testing at both ends of the fiber to detect and eliminate cross-fiber issues. - Show how to properly place joints in the chamber and coil spare cables (loop) within the joint enclosure. - Demonstrate predictive maintenance using data insights from AI-enabled tools to proactively identify potential faults. - Show how to integrate eco-friendly deployment techniques to minimize material waste during the testing process. - Demonstrate the process of maintaining a comprehensive jointing record for future reference. - Show how to record OTDR and power meter test results in the prescribed format.

	• Demonstrate how to submit test and jointing records to the appropriate authorities for validation and inspection. • Show how to update documentation on predictive maintenance and fault diagnostics conducted during testing.

Classroom Aids

Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films

Tools, Equipment and Other Requirements

Tweezers, Splices, OTDR, Mechanical Splicer, Fusion Splicer (Splicing Machine), Fiber Optic Test Source, Fiber Optic Stripper, Fiber Optic Power Meter, Connectors, Connector Crimper, Cleaver, Cable Jacket Stripper, Cable Cutter, Cable Splitter, Personal Protection Equipment: Hand Gloves, Safety Glasses, Head Protection, Warning Signs and Tapes.

Module 4: Health, Safety, and Sustainable Practices in Fiber Splicing
Mapped to TEL/N6401, v4.0

Terminal Outcomes:

- Discuss the importance of following health, safety, and sustainable practices during fiber splicing operations.

Duration (in hours): 10:00	Duration (in hours): 20:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the procedures for recycling fiber waste and deploying eco-friendly materials during fiber splicing. • Describe Health, Safety, and Environment (HSE) protocols, including handling Earth Potential Rise (EPR). • Discuss the safe disposal of waste materials and adherence to global sustainability practices. • Elucidate the first-aid procedures for injuries such as electrical shocks, cuts, and falls.	• Demonstrate how to check sites for potential health, safety, and environmental risks before beginning work. • Show how to use Personal Protective Equipment (PPE) such as helmets, safety glasses, gloves, and trench guards while splicing. • Demonstrate compliance with site-specific risk controls, OHS standards, and environmental guidelines. • Show how to identify and address environmental hazards like Earth Potential Rise (EPR) during testing and splicing. • Demonstrate the process of incorporating fiber waste recycling and adopting eco-friendly materials to align with global sustainability goals. • Show how to dispose of waste materials such as cut fibers in a safe and eco-friendly manner.
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Personal Protection Equipment: Hand Gloves, Safety Glasses, Head Protection, Warning Signs and Tapes	

Module 5: Employability Skills (30 Hours)
Mapped to DGT/VSQ/N0101, v1.0

Duration: 30:00 Hours
Key Learning Outcomes

Introduction to Employability Skills Duration: 1 Hour

After completing this programme, participants will be able to:

1. Discuss the importance of Employability Skills in meeting the job requirements

Constitutional values - Citizenship Duration: 1 Hour

2. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.

3. Show how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 1 Hour

4. Discuss 21st-century skills.

5. Display a positive attitude, self-motivation, problem-solving, time management skills and continuous learning mindset in different situations.

Basic English Skills Duration: 2 Hours

6. Use appropriate basic English sentences/phrases while speaking

Communication Skills Duration: 4 Hours

7. Demonstrate how to communicate in a well-mannered way with others.

8. Demonstrate working with others in a team

Diversity & Inclusion Duration: 1 Hour

9. Show how to conduct oneself appropriately with all genders and PwD

10. Discuss the significance of reporting sexual harassment issues in time

Financial and Legal Literacy Duration: 4 Hours

11. Discuss the significance of using financial products and services safely and securely.

12. Explain the importance of managing expenses, income, and savings.

13. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws

Essential Digital Skills Duration: 3 Hours

14. Show how to operate digital devices and use the associated applications and features, safely and securely

15. Discuss the significance of using the internet for browsing, and accessing social media platforms, safely and securely

Entrepreneurship Duration: 7 Hours

16. Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges

Customer Service Duration: 4 Hours

17. Differentiate between types of customers

18. Explain the significance of identifying customer needs and addressing them

19. Discuss the significance of maintaining hygiene and dressing appropriately

Getting ready for Apprenticeship & Jobs Duration: 2 Hours

20. Create a biodata

21. Use various sources to search and apply for jobs

22. Discuss the significance of dressing up neatly and maintaining hygiene for an interview

23. Discuss how to search and register for apprenticeship opportunities

Module 6: On-the-Job Training
Mapped to Optical Fiber Splicer

Mandatory Duration: 150:00	**Recommended Duration: 00:00**

Location: On-Site

Terminal Outcomes

- Demonstrate how to check the availability of tools, spares, and advanced equipment for fiber optic installations.

- Show how to prepare cables for splicing in new installations.

- Demonstrate how to maintain and troubleshoot laid Optical Fiber Cables (OFCs).

- Show how to perform advanced splicing operations with automation and precision.

- Demonstrate how to utilize advanced fiber testing tools and document the results.

- Show how to apply specialized splicing techniques for micro and nano fibers.

- Demonstrate how advanced tools are used to test the effectiveness of a fiber splice.

- Show how to record test results for traceability and performance analysis in fiber splicing.

- Demonstrate the importance of following health, safety, and sustainable practices during fiber splicing operations.

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialisation	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields	5	Optical Fiber Domain			

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Optical Fiber Splicer" mapped to QP: "TEL/Q4200, v5.0". Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, v3.0". The minimum accepted score as per MEPSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	*Specialization*	*Years*	*Specialization*	
Graduate	Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields	5	Optical Fiber Domain			

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Optical Fiber Splicer" mapped to QP: "TEL/Q4200, v5.0". Minimum accepted score is 80%.	Certified for the Job Role: "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701, v3.0", with a minimum score of 80%.

Assessment Strategy

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 levels 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

The trainee will be tested for the acquired skill, knowledge and attitude through formative/ summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

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 it 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
NCVET	National Council for Vocational Education and Training
QP	Qualification Pack
MC	Model Curriculum
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
NCO	National Classification of Occupations
ES	Employability Skills
TSSC	Telecom Sector Skill Council
TRAI	Telecom Regulatory Authority of India
PON	Passive Optical Network
GPON	Gigabit Passive Optical Network
OTDR	Optical Time Domain Reflectometer
OSA	Optical Spectrum Analyzer
CD	Chromatic Dispersion
PMD	Polarization Mode Dispersion
OFIs	Optical Fiber Installations
NOC	Network Operations Center
OSP	Outside Plant
WDM	Wavelength Division Multiplexing
TDMA	Time Division Multiple Access
ONT	Optical Network Terminal
VFL	Visual Fault Locator
CPE	Customer Premises Equipment