

QUALIFICATION FILE

Fiber to-the Home (FTTH/X) Installer

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☒ Apprenticeship

☒ Upskilling ☐ Dual/Flexi Qualification ☒ For ToT ☒ For ToA

☒ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF/NSQF Level: 3.0

Submitted By:

Telecom Sector Skill Council

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Section 1: Basic Details

1.	Qualification Name	Fiber to-the Home (FTTH/X) Installer													
2.	Sector/s	Telecom													
3.	Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: (QG-03-TL-00455-2023-V1.1-TSSC, V3.0)	Qualification Name of existing/previous version: Fiber to-the Home (FTTH/X) Installer												
4.	a. OEM Name b. Qualification Name (Wherever applicable)														
5.	National Qualification Register (NQR) Code &Version (Will be issued after NSQC approval)	QG-03-TL-04083-2025-V2-TSSC	6. NCrf/NSQF Level: 3.0												
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate													
8.	Brief Description of the Qualification	A Fiber to-the Home (FTTH/X) Installer is responsible for implementing fiber optic cabling from the Optical Line Test Set (OLTS) drop point to the customer's termination point, ensuring seamless last-mile connectivity. The job includes fiber splicing, termination at distribution points, and adherence to structured cabling standards, telecommunication regulations, and network safety norms.													
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Grade 10</td> <td></td> </tr> <tr> <td>2.</td> <td>8th Grade Pass</td> <td>3 years of experience in the operations and maintenance of passive infrastructure</td> </tr> <tr> <td>3.</td> <td>Previous relevant Qualification of NSQF Level 2.5</td> <td>1.5 years of experience in the operations and maintenance of passive infrastructure</td> </tr> </tbody> </table> b. Age: NA		S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1.	Grade 10		2.	8th Grade Pass	3 years of experience in the operations and maintenance of passive infrastructure	3.	Previous relevant Qualification of NSQF Level 2.5	1.5 years of experience in the operations and maintenance of passive infrastructure
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)													
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2.	8th Grade Pass	3 years of experience in the operations and maintenance of passive infrastructure													
3.	Previous relevant Qualification of NSQF Level 2.5	1.5 years of experience in the operations and maintenance of passive infrastructure													
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	15	11. Common Cost Norm Category (I/II/III) (wherever applicable): I												
12.	Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	NA													

13.	Training Duration by Modes of Training Delivery (<i>Specify Total Duration as per selected training delivery modes and as per requirement of the qualification</i>)	☐ Offline ☐ Online ☒ Blended <table border="1"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>150</td> <td>180</td> <td>120</td> <td></td> <td rowspan="2">450</td> </tr> <tr> <td>Online</td> <td>150</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i>					Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	150	180	120		450	Online	150			
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																		
Classroom (offline)	150	180	120		450																		
Online	150																						
14.	Aligned to NCO/ISCO Code/s (<i>if no code is available mention the same</i>)	NCO-2015/7422.0803																					
15.	Progression path after attaining the qualification (<i>Please show Professional and Academic progression</i>)	Fiber to-the Home (FTTH/X) Installer (NSQF Level 3) → Optical Fiber Technician (NSQF level 4)																					
16.	Other Indian languages in which the Qualification & Model Curriculum are being submitted	Hindi																					
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications:																					
18.	Is the Job Role Amenable to Persons with Disability	☒ Yes ☐ No If "Yes", specify applicable type of Disability: <i>Motor Impairment, Hearing Impairments, Speech and Language Disorders</i>																					
19.	How Participation of Women will be Encouraged	Encouraging the participation of women in the role of Fiber-to-the-Home (FTTH/X) Installer in the telecom sector can be achieved through strategies that foster diversity, inclusivity, and gender equality. This can include offering targeted training and skill development programs for female candidates interested in these roles. Additionally, creating a workplace culture that is safe, respectful, and inclusive, and free from harassment or discrimination, is crucial for ensuring equal opportunities for women in the telecom sector.																					
20.	Are Greening/ Environment Sustainability Aspects Covered (<i>Specify the NOS/Module which covers it</i>)	☒ Yes ☐ No NOS: TEL/N9111																					
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☐ Yes ☐ No Colleges ☒ Yes ☐ No																					
22.	Name and Contact Details of Submitting / Awarding Body SPOC (<i>In case of CS or MS, provide details of both Lead AB & Supporting ABs</i>)	Name: Mr. Praveen Sirohi Email: ceo@tsscindia.com Contact No.: 0124-4148029 Website: www.tsscindia.com																					
23.	Final Approval Date by NSQC: 08-05-2025	24. Validity Duration: 3 years			25. Next Review Date: 30-04-2028																		

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

Th.-Theory **Pr.**-Practical **OJT**-On the Job Training **Man.**-Mandatory **Rec.**-Recommended **Proj.**-Project

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.	Install Fiber-to-the-Home (FTTH/X) and Fiber-to-Anywhere (FTTx) Cables	TEL/N4143, v1.0	Core	3.0	3	20	40	30	-	90	30	50	-	20	100	15
2.	Splice Optical Fiber	TEL/N6400, v7.0	Core	3.0	5	30	60	60	-	150	30	50	-	20	100	15
3.	Installation of Passive FTTH/X components	TEL/N4200, v6.0	Core	3.0	3	40	20	30	-	90	30	50	-	20	100	15
4.	In-building FTTH/X cabling	TEL/N4201, v5.0	Core	3.0	1	10	20	-	-	30	30	50	-	20	100	15
5.	Work Safety Practices with Fiber Optics	TEL/N4131, v5.0	Core	3.0	1	10	20	-	-	30	30	50	-	20	100	15
6.	Follow sustainability practices in telecom cabling operations	TEL/N9111, v1.0	Core	4.0	1	10	20	-	-	30	30	50	-	20	100	15
7.	Employability Skills (30 Hours)	DGT/VSQ/N 0101, v1.0	Non-Core	2.0	1	30	-	-	-	30	20	30	-	-	50	10
Duration (in Hours) / Total Marks					15	150	180	120	-	450	200	330	-	120	650	100

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:

Minimum Pass Percentage – Aggregate at qualification level: 50 % (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)

Minimum Pass Percentage – NOS/Module-wise: 50 % (Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Educational Qualification: Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. Industry & Training Experience: Minimum 5 years of experience of industry in the Optical Fiber Domain. Certification: "Trainer" mapped to the Qualification Pack "MEP/Q2601". Minimum accepted score is 80% aggregate.
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Educational Qualification: Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. Industry & Training Experience: Minimum 7 years of industry experience in the Optical Fiber Domain. Certification: "Master Trainer" mapped to the Qualification Pack "MEP/Q2602". Minimum accepted score is 90% aggregate.
3.	Tools and Equipment Required for Training	☐ Yes ☐ No (If "Yes", details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

1.	Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Educational Qualification: Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. Industry & Training Experience: Minimum 5 years of experience of industry in the Optical Fiber Domain. Certification: "Assessor" mapped to the Qualification Pack "MEP/Q2701". Minimum accepted score is 80% aggregate.
2.	Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Educational Qualification: Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. Industry & Training Experience: Minimum 5 years of experience of industry in the Optical Fiber Domain. Certification: "Assessor" mapped to the Qualification Pack "MEP/Q2701". Minimum accepted score is 80% aggregate.

3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	Educational Qualification: Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. Industry & Training Experience: Minimum 7 years of experience of industry in the Optical Fiber Domain. Certification: "Lead Assessor" mapped to the Qualification Pack "MEP/Q2702" Minimum accepted score is 90% aggregate.
4.	Assessment Mode <i>(Specify the assessment mode)</i>	Offline/Online
5.	Tools and Equipment Required for Assessment	☒ Same as for training ☐ Yes ☐ No <i>(details to be provided in Annexure-if it is different for Assessment)</i>

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): NA
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): NA
3.	Government /Industry initiatives/ requirement (Yes/No): NA
4.	Number of Industry validation provided: 25
5.	Estimated nos. of persons to be trained and employed: 1000
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: <i>in process</i> If "No", why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	Annexure: NCrf/NSQF level justification based on NCrf level/NSQF descriptors <i>(Mandatory)</i>	Annexure 1
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	Annexure 2
3.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	Annexure 6
4.	Annexure: Assessment Strategy <i>(Mandatory)</i>	Annexure 7
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is "Blended Learning")</i>	NA

6.	Annexure: Multiple Entry-Exit Details (Mandatory, in case qualification has multiple Entry-Exit)	NA
7.	Annexure: Acronym and Glossary (Optional)	Annexure 8
8.	Supporting Document: Model Curriculum (Mandatory – Public view)	Attached
9.	Supporting Document: Career Progression (Mandatory - Public view)	Attached
10.	Supporting Document: Occupational Map (Mandatory)	Attached
11.	Supporting Document: Assessment SOP (Mandatory)	Attached
12.	Any other document you wish to submit:	NO

Annexure 1: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	The Professional Theoretical/Practical knowledge required for the job role are: Install Fiber-to-the-Home (FTTH/X) and Fiber-to-Anywhere (FTTx) Cables • Pre-installation checks and processes • Direct buried installation • Underground (duct) installation • Aerial installation • FTTx solutions • Network planning and design considerations Splicing Optical Fiber • Check the availability of tools, spares, and advanced equipment • Prepare cables for splicing for new installations • Maintain and troubleshoot laid Optical Fiber Cables (OFCs) • Perform advanced splicing operations with automation and precision • Utilize advanced fiber testing tools and document results • Perform specialized splicing techniques for micro	A Fiber-to-the-Home (FTTH/X) Installer must possess a command of wide-ranging specialized theoretical and practical skills, involving variable routine and non-routine contexts. This includes expertise in installing, splicing, testing, and maintaining fiber optic networks while adhering to safety, regulatory, and environmental standards. The installer should be proficient in handling diverse installation scenarios, ensuring seamless connectivity, and troubleshooting fiber networks. They must also follow sustainability practices and industry guidelines to optimize resource usage and maintain compliance with environmental standards. This foundational expertise ensures that the installer can execute fiber optic installations efficiently while maintaining quality, safety, and sustainability. Hence, this role falls under Level 3.	3.0

	and nano fibers Installation of Passive FTTH/X components • Install passive FTTH/X components (Splitters) • Perform terminal connections (single incoming/multiple outgoing) • Conduct power and insertion loss tests • Work with GPON technologies, loss budgets, and advanced transmission mechanisms In-building FTTH/X cabling • Cable installation through cable trays (horizontal/vertical) • Cable installation through conduits • Cable installation through false ceilings • Termination at ONT and TO • IoT and Smart Home Network Readiness • FTTH GPON Customer Installation • Triple-Play Services (High Speed Internet, VoIP, IPTV) • Cybersecurity considerations in FTTH/X installations • Internet of Everything (IoE) Work Safety Practices with Fiber Optics • Safety practices for working with fiber optics during FTTH/X installations • Industry standards and guidelines Follow sustainability practices in telecom cabling operations • Identify recyclable, reusable, and hazardous materials • Follow waste recycling and disposal protocols • Optimize material and energy usage in cabling work • Comply with environmental and regulatory standards		
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Know how to perform pre-installation checks and processes to ensure all necessary materials, tools, and safety measures are in place before beginning the fiber optic installation. • Understand the direct buried installation method for fiber optic cables, including trenching, cable protection, and proper backfilling techniques to prevent damage.	A Fiber-to-the-Home (FTTH/X) Installer – Level 3 requires specialized theoretical and practical skills to install, maintain, and troubleshoot fiber optic networks. The role involves pre-installation checks, underground and aerial installations, fiber splicing, passive component installation, and in-building cabling. Installers must ensure compliance with safety protocols, industry standards, and sustainability	3.0

	• Know how to carry out underground (duct) installation by threading fiber optic cables through conduits, ensuring minimal signal loss and protection from environmental factors. • Understand aerial installation procedures, including pole mounting, tensioning, and securing fiber cables while complying with safety and regulatory standards. • Know how to implement various FTTx solutions by selecting appropriate deployment models based on customer requirements, network infrastructure, and geographic constraints. • Understand network planning and design considerations, including fiber route selection, redundancy planning, and capacity optimization for efficient and scalable deployments. • Know how to check the availability of tools, spares, and advanced equipment required for fiber optic splicing and testing, ensuring all necessary resources are on hand. • Understand how to prepare cables for splicing in new installations by stripping, cleaving, and aligning fiber strands while minimizing signal loss and contamination. • Know how to maintain and troubleshoot laid Optical Fiber Cables (OFCs) by identifying faults, using testing tools, and performing necessary repairs or replacements. • Understand how to perform advanced splicing operations with automation and precision, utilizing fusion splicing techniques to ensure minimal insertion loss. • Know how to utilize advanced fiber testing tools, such as OTDR and power meters, to document and analyze network performance, ensuring compliance with quality standards. • Understand specialized splicing techniques for micro and nano fibers, which require precision handling and specialized equipment for high-density fiber applications. • Know how to install passive FTTH/X components, such as optical splitters, to ensure efficient distribution of fiber	practices while optimizing network performance. They also handle IoT integration, cybersecurity considerations, and customer installations for high-speed internet, VoIP, and IPTV services. By following best practices in waste disposal and recycling and energy conservation, they contribute to a reliable digital infrastructure. Hence, this role falls under Level 3.	
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	signals within the network. • Understand how to perform terminal connections, including single incoming and multiple outgoing configurations, to establish seamless network connections. • Know how to conduct power and insertion loss tests using optical test equipment to verify network integrity and optimize signal performance. • Understand how to work with GPON technologies, loss budgets, and advanced transmission mechanisms to enhance network efficiency and reliability. • Know how to install fiber optic cables through horizontal and vertical cable trays, ensuring secure and organized routing within buildings. • Understand how to install fiber optic cables through conduits, protecting them from physical damage and environmental hazards. • Know how to install fiber optic cables through false ceilings while ensuring proper support and cable management to maintain network reliability. • Understand how to terminate fiber optic cables at Optical Network Terminals (ONT) and Telecommunication Outlets (TO), ensuring optimal connectivity and performance. • Know how to assess IoT and Smart Home Network Readiness, integrating fiber optic connections with emerging smart technologies for seamless connectivity. • Understand FTTH GPON Customer Installation procedures, including configuring and testing customer premises equipment for reliable internet, voice, and TV services. • Know how to deliver Triple-Play Services, including high-speed internet, VoIP, and IPTV, ensuring proper bandwidth allocation and service quality. • Understand cybersecurity considerations in FTTH/X installations, ensuring secure network configurations and data protection measures. • Know how to implement Internet of Everything (IoE)		
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	concepts in fiber optic deployments, supporting emerging applications in smart cities, industries, and homes. • Understand safety practices for working with fiber optics during FTTH/X installations, including proper handling of fiber strands, eye protection, and hazardous material management. • Know how to follow industry standards and guidelines to ensure compliance with national and international fiber optic installation protocols. • Understand how to identify recyclable, reusable, and hazardous materials in fiber optic installation, ensuring responsible waste management. • Know how to follow waste management, recycling, and disposal protocols to minimize environmental impact in fiber optic cabling operations. • Understand how to optimize material and energy usage in cabling work, reducing waste and improving efficiency in fiber deployments. • Know how to comply with environmental and regulatory standards related to fiber optic installations, ensuring sustainable and legal operations. • Understand how to perform work as per quality standards, maintaining consistency and reliability in fiber optic network installations.		
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Select appropriate tools and technologies required for fiber optic installation and maintenance. • Identify potential business opportunities in the fiber optic industry, including network expansion and service provisioning. • Learn effective communication and customer service skills to engage with clients and address their requirements. • Implement problem-solving strategies to troubleshoot fiber network issues and ensure seamless connectivity. • Evaluate market trends and emerging technologies to stay updated with advancements in the telecom sector.	Employment readiness and entrepreneurship skills for an FTTH/X Installer focus on technical proficiency, business acumen, and professional growth. Installers must select the right tools and technologies, identify market opportunities, and learn strong customer service skills. They should implement problem-solving strategies, evaluate industry trends, and design efficient work plans. Understanding basics of financial management, standard operating procedures, and quality control measures is crucial for ensuring compliance and business success. By establishing professional networks and staying updated with emerging	3.0

	- Design efficient work plans and schedules to optimize productivity and service delivery. - Define standard operating procedures (SOPs) for safe handling of fiber optic components and equipment. - Establish professional relationships with vendors, suppliers, and clients to enhance business growth. - Learn financial literacy skills for budgeting, cost estimation, and resource allocation in fiber optic projects. - Implement quality control measures to ensure compliance with industry standards and best practices.	technologies, installers can enhance their career prospects and contribute to the growing telecom industry. Therefore, this role is considered at Level 3.	
Broad Learning Outcomes/Core Skill	The Broad Learning Outcomes/Core Skill are: - Understand fiber optic network installation processes, including underground, aerial, and in-building cabling techniques. - Demonstrate the ability to perform fiber splicing, termination, and testing using advanced tools and equipment. - Apply industry standards, safety protocols, and environmental guidelines in fiber optic installations. - Learn problem-solving skills to troubleshoot and maintain fiber networks for uninterrupted service. - Implement customer service best practices, ensuring effective engagement and resolution of client concerns. - Evaluate network performance using optical testing tools such as OTDR, power meters, and fiber detection meters. - Define quality control measures to ensure compliance with technical and regulatory standards. - Establish efficient work planning, time utilization, and resource optimization strategies in fiber optic projects. - Identify entrepreneurial opportunities in the fiber optic industry, including business setup and service expansion. - Demonstrate basic financial literacy skills to control project budgeting, and resource allocation effectively. - Select and implement sustainable practices, including waste	The Fiber-to-the-Home (FTTH/X) Installer role at NSQF Level 3 requires a practical, hands-on approach with a command of specialized theoretical and technical skills in fiber optic network installations. Installers must perform routine and non-routine tasks such as fiber splicing, testing, troubleshooting, and customer engagement while adhering to safety and environmental standards. They should demonstrate basic problem-solving abilities, effective communication, and work planning to ensure seamless network deployment. Additionally, their role involves limited independent decision-making under supervision, aligning with NSQF Level 3, which focuses on applying knowledge in familiar and predictable work environments while progressively developing expertise in the field.	3.0

	disposal, recycling, and energy conservation. • Apply cybersecurity considerations and IoT integration techniques in FTTH/X network installations. • Learn professional communication skills to coordinate with clients, vendors, and team members efficiently. • Implement continuous learning strategies to stay updated with emerging fiber optic technologies and trends.		
Responsibility	The responsibilities are: • Pre-installation checks and processes • Direct buried installation • Underground (duct) installation • Aerial installation • FTTx solutions • Network planning and design considerations • Check the availability of tools, spares, and advanced equipment • Prepare cables for splicing for new installations • Maintain and troubleshoot laid Optical Fiber Cables (OFCs) • Perform advanced splicing operations with automation and precision • Utilize advanced fiber testing tools and document results • Perform specialized splicing techniques for micro and nano fibers • Install passive FTTH/X components (Splitters) • Perform terminal connections (single incoming/multiple outgoing) • Conduct power and insertion loss tests • Work with GPON technologies, loss budgets, and advanced transmission mechanisms • Cable installation through cable trays (horizontal/vertical) • Cable installation through conduits • Cable installation through false ceilings	A Fiber to-the Home (FTTH/X) Installer is responsible for implementing fiber optic cabling from the Optical Line Test Set (OLTS) drop point to the customer's termination point, ensuring seamless last-mile connectivity. The job includes fiber splicing, termination at distribution points, and adherence to structured cabling standards, telecommunication regulations, and network safety norms.	3.0

	- Termination at ONT and TO - IoT and Smart Home Network Readiness - FTTH GPON Customer Installation - Triple-Play Services (High Speed Internet, VoIP, IPTV) - Cybersecurity considerations in FTTH/X installation - Internet of Everything (IoE) - Safety practices for working with fiber optics during FTTH/X installations - Industry standards and guidelines - Identify recyclable, reusable, and hazardous materials - Follow waste recycling and disposal protocols - Optimize material and energy usage in cabling work - Comply with environmental and regulatory standards		
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Annexure 2: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1.	OTDR	Pieces	1
2.	Fusion Splicer (Splicing machine)	Pieces	2
3.	Mechanical Splicer	Pieces	6
4.	Fiber Optic Test Source	Pieces	1
5.	Fiber Optic Stripper	Pieces	6
6.	Fiber Optic Power Meter	Pieces	1
7.	Cable Jacket Stripper	Pieces	6
8.	Tweezers	Pieces	6
9.	Splices	Pieces	6
10.	Slack brackets	Pieces	6
11.	Shaft	Pieces	6
12.	Safety Gear (Hand gloves, Eye protective glass)	Pieces	1
13.	Connectors	Pieces	6
14.	Connector Crimper	Pieces	6
15.	Cleaver	Pieces	6
16.	Cable Splitter	Pieces	6
17.	Cable Cutter	Pieces	6

18.	Fiber optic Cables (Multi-tube single/double jacket, dielectric armoured fiber, uni-tube/multi-tube single/double jacket, ADSS fiber cable etc.)	Mtr.	200
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Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Whiteboard
2. Projector
3. Computer/Laptop
4. Chairs
5. Tables
6. Whiteboard marker
7. Duster

Annexure 3: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1.	Ibus Network and infrastructure Pvt.Ltd.	TK Narayanan	Deputy General Manager Commercial	7th Floor Tower B, Vatika Towers Golf Crouse Road Sector 54 Gurugram, Haryana India 122011	9582210206	tk.narayanan@ibusnetworks.com	
2.	ICAI Computer & IT Skill Enhancement Institute (ICSE)	Er. Kamaljeet Kumar Sharma	Managing Director	#2266 (Site No. 24), Phase 7/Sector 61, S.A.S Nagar (Mohali) 160062, Punjab (India)	62849 16580, 9876613092	contact@icseinstitute.com kksmhl@gmail.com	
3.	JRS Global Networks Pvt.Ltd.	Arvind Yadav	Asst. Account Manager Telecom	A 22, Sector-65 Noida, UP-201307	9910430365	account3@jrsgl.com	
4.	Expert Consultant & Coach for Telecom Fibre Optics, FTTx and Broadband	Dr. Anuj Shrivastava	Ex Executive Director Indian Telecom Services	Ghaziabad, UP	9868133345	srianujkumar@gmail.com	

5.	Jio Platforms Limited (Jio)	Abhijay Singh Sisodia	Senior Manager	Office-101, Saffron, Nr.Centre Point, Panchwati 5 Rasta, Ambawadi, Ahmedabad-380006 Gujarat	7042479449	abhijay.sisodia@ril.com	
6.	Vodafone India Shared Service Private Limited	Manmohan Sharma	Deputy General Manager	0-4th floor, Cluster D, Wing 3, EON Free Zone, Kharadi, Pune, Maharashtra 411014	7030930950	manmohan.sharma@vodafone.com	
7.	Teeco	Naman Khosla Abhijay Singh Sisodia	Technical Consultant	Infotech Center -6th floor, 14/2 Old Delhi Gurgaon Road, Dundaheera, Gurgaon - 122016, India	9808251828	naman.khosla@teeco.com	
8.	Global Logic	Rashid Muhammad	Associate Manager	Plot No.7, Oxygen Business Park SEZ, Tower, 3, Noida-Greater Noida Expy, Sector 144, Noida, Uttar Pradesh 201304	8881474420	rashid.muhammad@globallogic.com	
9.	Mahendra Technical Institute	Mahendra Brmukh	Chairman and Managing Director	1st Floor, 3/B M B Classic, Telco Road, Near Kailash Dairy, Chinchwad Station, Pune - 411019 Maharashtra, India	9822009128	info.mtipune@gmail.com	
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15	Tata Communication	Alka Asthana	Head of Regulatory Affairs	Next Gen Tower Outer Ring Road, GK-1, New Delhi - 110048	011 66505058	alka.asthanatelecom@gmail.com	
16	Reckitt Benckiser	Sachin Sharma	Demand Manager	Udyog Vihar, Phase V, Gurgaon, Haryana	9758573077	sachin.sharma@rb.com	
17	Sycamore Informatics	Rahul Kumar Kaushik	Product Manager	No. 6, 2nd Floor, 2nd Main, Arekere, Off Bannerghatta Road, Bangalore 560076	8859885973	rahul.kaushik@sycamoreinformatics.com	
18	Nokia	Saurabh Singh	Software Quality Engineer	L5 and L6 Building Manyata Embassy Business Park Outer Ring Road, Nagawara 560045	-	saurabh.9.singh@nokia.com	
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20	Conduent	Prince Jain	Sr. Business Analyst	Plot No. 20, Candor Tech Space, Noida 201304	8439385780	prince.jain@conduent.com	
21	Artificial Intelligence Technologies	Rohit Kumar Sharma	Manager - Development	A-21, sector 4, Block A, Kailash Colony, Greater Kailash, New Delhi,	9927564461	rohit.sharma@aituniversal.com	

22	Ecom Express.in	Shekhar Poswal	Senior QA L1	10 th Floor, Ambience Corporate Tower II, Ambience Island, Gurugram 122001	8588820616	Shekhar.p@ecomexpress.in	
23	Paarminder Electronics Process Consultancy	Paarminder Singh	Consultant	New Delhi	9643353395	singhpaarminder@gmail.com	
24	Senryaku Consulting	Udit Kaushik	Co-founder	Senryaku Management Private Limited Address: UTC031, DLF The Ultima, Sector 81, Gurugram, HR 122004	9690909024	udit.kau@gmail.com	
25	Sopra Steria	Rikan Singh Tomar	Team Leader	Plot No. 20 & 21, Seaview Special Economic Zone, Building 4, Sector 135, Noida, Uttar Pradesh 201304	9599944652	rikan.singh@soprasteria.com	

Annexure 4: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2025	200	75	10	5	5	5

2026	300	100	15	10	10	10
2027	500	200	25	10	10	10

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
4.0	April 2024 to March 2025	1389	62	48									

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented:

1.
2.

Content availability for previous versions of qualifications:

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available:

Annexure 5: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET “Guidelines for Blended Learning for Vocational Education, Training & Skilling” available on:

<https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf>

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline: Online Ratio
1	☒ Theory/ Lectures - Imparting theoretical and conceptual knowledge	LMS Portal- TSSC Telco Learning Portal will be utilized with online content/virtual lectures (Telcolearning.com)	100:100
2	☒ Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	LMS Portal- TSSC Telco Learning Portal will be utilized with online content/virtual lectures (Telcolearning.com)	100:100
3	☐ Showing Practical Demonstrations to the learners		
4	☐ Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☐ Tutorials/ Assignments/ Drill/ Practice		
6	☐ Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☐ On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure 6: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
TEL/N4143: Install Fiber-to-the-Home (FTTH/X) and Fiber-to-Anywhere (FTTx) Cables	<i>Pre-installation checks and processes</i>	6	12	-	5
	PC1. conduct pre-deployment surveys, including advanced route mapping using Geographic Information Systems (GIS) tools and FTTx architecture requirements	1	2	-	0.5
	PC2. perform pre-tests of optical cables using OTDR and AI-enabled diagnostic tools to ensure network readiness	1	2	-	1
	PC3. ensure cable compliance with advanced standards, including bend-insensitive and high-density cables suitable for FTTx variations	1	2	-	1
	PC4. Verify critical parameters such as maximum pulling tension, bend radius, and cable diameter to ensure installation adherence to design specifications	1	2	-	1
	PC5. Use duct preparation tools, including duct integrity testing and cleaning with compressed air or vacuum systems, ensuring readiness for cable installation	1	2	-	1
	PC6. Ensure necessary permissions and compliance with regulatory requirements, including local laws and environmental guidelines	1	2	-	0.5

	<i>Direct buried installation</i>	5	10	-	4
PC7.	select appropriate cable types (e.g., armored, non-armored, water-blocking cables) based on site-specific requirements and environmental factors	1	2	-	0.5
PC8.	perform trenching using precision-guided trenching tools, ensuring minimal environmental impact	1	2	-	1
PC9.	follow advanced practices for armor bonding and grounding to maintain signal integrity	1	2	-	1
PC10.	ensure proper cable laying, covering, and placement of physical markers, adhering to environmental and safety standards	1	2	-	1
PC11.	perform trench reinstatements using eco-friendly materials to meet sustainability guidelines	1	2	-	0.5
	<i>Underground (duct) installation</i>	5	10	-	5
PC12.	use automated duct cable pulling tools and accessories like motorized winches and smart pulling grips for efficient installations	1	2	-	1
PC13.	execute cable blowing using advanced machines equipped with AI monitoring for friction and duct-fill optimization	1	2	-	1
PC14.	test duct suitability, coefficient of friction, and other factors affecting cable longevity using specialized tools	1	2	-	1
PC15.	perform figure-8 cable coiling techniques to prevent damage during long-haul installations	1	2	-	1
PC16.	integrate multiple ducts with proper sealing and alignment, ensuring scalability and durability	1	2	-	1
	<i>Aerial installation</i>	3	6	-	2
PC17.	handle aerial-specific cables like ADSS cables with tension control tools to ensure stability and longevity	0.5	1	-	0.5
PC18.	survey poles, messenger strands, and aerial infrastructure for damage or potential challenges using drones and smart tools	0.5	1	-	0.5
PC19.	install messenger strands and aerial cables safely using lift buckets or similar equipment	1	2	-	0.5
PC20.	conduct wind-loading analysis and implement mitigation techniques to enhance network reliability	1	2	-	0.5
	<i>FTTx solutions</i>	4	6	-	2
PC21.	install fiber for FTTx variations, including Fiber to the Node (FTTN), Fiber to the Curb (FTTC), Fiber to the Building (FTTB) and Fiber-to-the-Desk (FTTD)	1	1	-	0.5
PC22.	deploy and configure pre-connectorized optical cables, micro-trenching, and micro-ducts for high-density urban applications	1	1	-	0.5
PC23.	integrate network components like ONTs, OLTs, splitters, and IoT devices to create efficient smart home and enterprise networks	1	2	-	0.5
PC24.	ensure seamless splicing and terminations for FTTx networks using precision splicing tools	1	2	-	0.5
	<i>Network planning and design considerations</i>	3	6	-	2
PC25.	apply network planning and design principles, including selection of the right architecture (PON, GPON) for deployment based on site needs	0.5	1	-	0.5

	PC26. determine infrastructure requirements, such as conduit paths, fiber type, and distribution points, ensuring optimal resource use	0.5	1	-	0.5
	PC27. ensure alignment with the applicable regulatory and compliance requirements for FTTH network design	1	2	-	0.5
	PC28. select appropriate equipment and materials for scalability and future upgrades	1	2	-	0.5
	Total Marks	30	50	-	20
TEL/N6400: Splice Optical Fiber	<i>Check the availability of tools, spares, and advanced equipment</i>	<i>4</i>	<i>10</i>	<i>-</i>	<i>4</i>
	PC1. check the availability and functionality of advanced optical testing tools such as AI-enabled Optical Time-Domain Reflectometer (OTDR), power meter, Optical Spectrum Analyzer (OSA), Chromatic Dispersion (CD) Analyzer, and Polarization Mode Dispersion (PMD) Analyzer	1	2	-	0.5
	PC2. check for the availability of tools for advanced splicing including automated splicers, robotic arms, precision cleavers, smart cleavers, splice trays, and inspection tools	1	2	-	0.5
	PC3. check for adequate stock of splicing consumables including joint kits, connectors, patch cords, heat shrink sleeves, and environmental sealing materials along with RCC joint chambers, fiber optic enclosures, and other site-specific materials	1	2	-	1
	PC4. ensure splicing machines and testing equipment are calibrated, updated with the latest firmware, and meet precision standards	0.5	2	-	1
	PC5. handle inventory and coordinate repair or replacement of faulty tools through defined channels	0.5	2	-	1
	<i>Prepare cables for splicing for new installations</i>	<i>5</i>	<i>12</i>	<i>-</i>	<i>4</i>
	PC6. locate and identify fibers for splicing as per network designs, connectivity plans and colour-coded sequences using automated mapping tools	0.5	2	-	0.5
	PC7. check cables for physical and sheath damage using visual and advanced inspection tools	1	2	-	0.5
	PC8. prepare optical fibers by removing jackets and cleaning cores using automated cleaning systems	1	2	-	0.5
	PC9. secure cables and ensure compliance with bend radius and stress limits specified by manufacturers	0.5	2	-	0.5
	PC10. install and ground joint closures, splitters, and pigtails with weatherproofing measures to minimize environmental effects	0.5	2	-	1
	PC11. manage routing of connectorized fibers inside junction boxes and document compliance with network plans	0.5	1	-	0.5
	PC12. perform twist splicing for copper or hybrid cables where applicable	1	1	-	0.5
	<i>Maintain and troubleshoot laid Optical Fiber Cables (OFCs)</i>	<i>8</i>	<i>12</i>	<i>-</i>	<i>4</i>
	PC13. identify fiber faults using advanced tools such as AI-enabled OTDR and real-time monitoring systems	1	2	-	0.5
	PC14. use robotic arms, Optical Fiber Identifiers (OFIs), and smart cleavers for precise maintenance in challenging environments	1	1	-	0.5
	PC15. coordinate with the Network Operations Center (NOC) for outage windows and route updates	1	1	-	0.5

	PC16. access fault points safely and inspect for microbends, sheath damage, or environmental wear using advanced inspection tools	1	1	-	0.5
	PC17. clean and prepare all fibers for splicing as per applicable specifications	1	2	-	0.5
	PC18. replace damaged sections, re-splice fibers, and ensure all connections meet loss and reflection standards	1	2	-	0.5
	PC19. secure and weatherproof cables following the applicable standards	1	2	-	0.5
	PC20. document maintenance and troubleshooting activities digitally for analysis and reporting	1	1	-	0.5
	<i>Perform advanced splicing operations with automation and precision</i>	<i>8</i>	<i>10</i>	-	<i>4</i>
	PC21. operate advanced fusion splicing machines with automation features to minimize human error	1	1	-	0.5
	PC22. perform mechanical, fusion, ribbon, crimp, mass and nano fiber splicing for various network applications, including harsh environments	1	2	-	0.5
	PC23. ensure splice quality using real-time diagnostics integrated into automated splicing machines	1	1	-	0.5
	PC24. minimize splice loss and optimize alignment using precision cleavers and advanced imaging tools	1	1	-	0.5
	PC25. test splice quality using real-time monitoring systems integrated into splicers	1	2	-	0.5
	PC26. seal splices with heat-shrink or cold-shrink closures, ensuring protection against environmental factors	1	1	-	0.5
	PC27. conduct micro and nano fiber splicing using specialized tools for high-performance, low-loss connections in specialized industries such as medical and military communications	1	1	-	0.5
	PC28. document splicing details and results digitally for future reference	1	1	-	0.5
	<i>Utilize advanced fiber testing tools and document results</i>	<i>5</i>	<i>6</i>	-	<i>4</i>
	PC29. use AI-enabled OTDR for real-time fault detection, predictive maintenance, and accurate loss measurement	1	2	-	1
	PC30. test signal quality and propagation characteristics using advanced tools such as OSAs, CD analyzers, and PMD analyzers	1	1	-	0.5
	PC31. verify performance KPIs, including attenuation, reflection, and chromatic dispersion, for spliced fibers	1	1	-	0.5
	PC32. generate automated reports using cloud-based platforms for remote monitoring and compliance tracking	1	1	-	1
	PC33. maintain proper documentation of test results for quality assurance and network optimization	1	1	-	1
	Total Marks	30	50	-	20
TEL/N4200: Installation of Passive FTTH/X components	<i>Install passive FTTH/X components (Splitters)</i>	<i>10</i>	<i>20</i>	-	<i>7</i>
	PC1. identify and assess passive components, including PLC and FBT splitters, and their deployment environments	2	4	-	2
	PC2. install wall-mount and rack-mount splitters (e.g., 1x8, 1x16, 1x32) using precision tools and advanced equipment	2	4	-	2
	PC3. ensure compatibility of splitters with GPON and emerging PON technologies like XG-PON and NG-PON2	2	4	-	1

	PC4. check installation sites for optimal placement to minimize signal loss, comply with building standards, and address environmental impacts	2	4	-	1
	PC5. identify and configure splitters for advanced transmission technologies, including Wavelength Division Multiplexing (WDM) and Time Division Multiple Access (TDMA)	2	4	-	1
	<i>Perform terminal connections (single incoming/multiple outgoing)</i>	6	10	-	4
	PC6. identify and organize feeder and distribution cables/pigtails for efficient routing and minimal signal interference	2	3	-	1
	PC7. use advanced connectors (e.g., SC, LC, APC) to establish secure and loss-free connections	2	3	-	1
	PC8. apply fiber management techniques to ensure organized, secure, and scalable installations	1	2	-	1
	PC9. perform final connector polishing to maximize optical clarity and reduce insertion loss	1	2	-	1
	<i>Conduct power and insertion loss tests</i>	6	10	-	4
	PC10. conduct insertion loss and reflection testing using advanced OLTS and OTDR equipment	2	2	-	1
	PC11. measure power output at distribution ports using precision power meters	1	3	-	1
	PC12. validate network performance parameters for compliance with GPON and NG-PON2 standards	1	2	-	1
	PC13. analyze and calculate loss budgets, considering WDM and TDMA technologies, to ensure network design compliance	2	3	-	1
	<i>Work with GPON technologies, loss budgets, and advanced transmission mechanisms</i>	8	10	-	5
	PC14. install and configure passive components compatible with advanced GPON, XG-PON, and NG-PON2 networks	2	2	-	1
	PC15. identify the role of broadcast technologies in GPON deployments and configure splitters accordingly	2	2	-	1
	PC16. use AI-enabled diagnostic tools for real-time fault detection, insertion loss tracking, and troubleshooting	2	2	-	1
	PC17. analyze the impact of components (e.g., splitters, connectors) on loss budgets and optimize designs using best practices	1	2	-	1
	PC18. validate the configuration and deployment of advanced transmission mechanisms like WDM and TDMA for optimized bandwidth utilization	1	2	-	1
	Total Marks	30	50	-	20
TEL/N4201: In-building FTTH/X cabling	<i>Cable installation through cable trays (horizontal/vertical)</i>	6	10	-	3
	PC1. check the site as per the building layout plan and identify the cabling path from the outdoor fiber landing point to the ONT installation point	1	2	-	0.5
	PC2. determine horizontal and vertical cable lengths, considering slack for maintenance and future upgrades	1	2	-	0.5
	PC3. check load compliance of cable trays and ensure compatibility with existing services like power and data cables	1	2	-	0.5

PC4.	lay fiber along tray tracks using proper pulling techniques, ensuring no damage to the cable jacket or core	1	2	-	0.5
PC5.	secure fibers in the trays, maintaining proper slack and tension to avoid over-tensioning in vertical runs	1	1	-	0.5
PC6.	ensure proper grounding of metallic trays in line with safety standards	1	1	-	0.5
<i>Cable installation through conduits</i>		4	4	-	2
PC7.	pull fiber through conduits using appropriate tools (e.g., fish tape, pullers) to avoid damage	1	1	-	0.5
PC8.	secure excess fiber (minimum of 3 meters) at termination points for maintenance purposes	1	1	-	0.5
PC9.	inspect conduit integrity to prevent electromagnetic interference or mechanical damage	1	1	-	0.5
PC10.	ensure proper sealing of conduits to avoid dust, moisture, or pest intrusion	1	1	-	0.5
<i>Cable installation through false ceilings</i>		2	4	-	2
PC11.	install cables through false ceilings using the figure-8 method to prevent tangling or cable stress	1	1	-	1
PC12.	secure cables in conduits above false ceilings to prevent dislodgement and ensure slack management	0.5	2	-	0.5
PC13.	ensure accessibility for future maintenance by marking cable routes clearly	0.5	1	-	0.5
<i>Termination at ONT and TO</i>		3	4	-	2
PC14.	terminate and connectorize fiber at the ONT, ensuring signal integrity and minimal loss	1	1	-	0.5
PC15.	power up and configure the ONT for operational readiness, including VLAN and IP address settings	1	1	-	0.5
PC16.	conduct live fiber testing using tools like Visual Fault Locator (VFL) and power meters to confirm signal integrity	0.5	1	-	0.5
PC17.	validate ONT connectivity to IoT devices and smart home systems, ensuring proper data throughput	0.5	1	-	0.5
<i>IoT and Smart Home Network Readiness</i>		3	5	-	2
PC18.	determine IoT device connectivity requirements such as bandwidth and latency, and verify network configuration	0.5	1	-	0.5
PC19.	installation network elements or CPEs for IoT devices	0.5	1	-	0.5
PC20.	configure ONTs to support IoT devices like smart thermostats, cameras, and voice assistants	1	1	-	0.5
PC21.	test IoT device compatibility with installed FTTH networks to ensure seamless integration	0.5	1	-	-
PC22.	coordinate with customers for specific IoT device setups and provide technical guidance	0.5	1	-	0.5
<i>FTTH GPON Customer Installation</i>		4	6	-	2
PC23.	check and prepare customer premises for installing Customer Premises Equipment (CPE), including ONTs and Wi-Fi routers	1	1	-	0.5
PC24.	follow GPON installation procedures, ensuring correct splitter connections and fiber termination	1	1	-	0.5

	PC25. conduct comprehensive tests for connectivity and data speeds at the customer's end using tools like OTDR and fiber testers	0.5	1	-	0.5
	PC26. troubleshoot network issues related to CPE and ensure customer satisfaction by addressing concerns promptly	0.5	1	-	-
	PC27. identify and resolve common complaints related to fiber connectivity, signal loss, and ONT/router configurations	0.5	1	-	0.5
	PC28. use installed equipment and provide basic troubleshooting training to customers, explaining technical details in easy terms and addressing their concerns	0.5	1	-	-
	<i>Triple-Play Services (High Speed Internet, VoIP, IPTV)</i>	3	5	-	2
	PC29. determine the infrastructure requirements for Triple-Play services, including separate VLANs for data, voice, and video	1	2	-	0.5
	PC30. configure ONT settings to enable Triple-Play services, ensuring optimal bandwidth allocation for each	1	1	-	0.5
	PC31. test High-Speed Internet, VoIP, and IPTV services for Quality of Service (QoS) parameters like latency, jitter, and packet loss	0.5	1	-	0.5
	PC32. coordinate with service providers to address issues with VoIP call quality, IPTV buffering, or internet speeds	0.5	1	-	0.5
	<i>Cybersecurity Considerations in FTTH/X Installations</i>	3	6	-	2
	PC33. identify potential cybersecurity vulnerabilities in FTTH installations and mitigate risks using secure installation practices	1	1	-	0.5
	PC34. configure ONTs with secure settings, including password protection, encryption protocols, and firewalls	1	1	-	0.5
	PC35. conduct penetration tests to identify potential security risks and validate network integrity	0.5	2	-	0.5
	PC36. provide customers with guidelines for maintaining network security, including password updates and device firmware updates	0.5	2	-	0.5
	<i>Internet of Everything (IoE)</i>	2	6	-	3
	PC37. identify the scope of IoE and its impact on FTTH network design and installation	0.5	2	-	1
	PC38. integrate IoE-compatible devices into the FTTH network, ensuring seamless communication between devices	0.5	2	-	1
	PC39. follow future trends in IoE and identify scalable network solutions for customers	0.5	1	-	0.5
	PC40. optimize FTTH installations for emerging IoE applications, ensuring minimal latency and maximum reliability	0.5	1	-	0.5
	Total Marks	30	50	-	20
TEL/N4131: Work Safety Practices with Fiber Optics	<i>Safety practices for working with fiber optics during FTTH/X installations</i>	20	30	-	15
	PC1. follow appropriate eye-safety measures whilst working with laser-emitting devices, including Optical Network Terminals (ONTs) and splicing equipment	2	3	-	2
	PC2. safely handle bare fiber, broken ends, and scraps, ensuring proper disposal to prevent accidental injury	2	3	-	2
	PC3. follow the recommended fire safety practices, especially when using high-voltage arc fusion splicers and other heating tools	2	3	-	1

	PC4. adhere to electrical safety norms when working with fiber cables installed alongside electrical cables and active power sources	2	3	-	1
	PC5. follow laser safety rules, including proper handling of Class 1M and higher laser devices used in FTTH networks	2	3	-	2
	PC6. use and maintain appropriate safety gear, such as gloves, boots, and protective eyewear, in accordance with worksite requirements	2	3	-	2
	PC7. follow industry standards and guidelines (e.g., ANSI Z136.2 for laser safety, ISO standards for fiber optic installations)	2	3	-	1
	PC8. maintain health and safety records accurately, including incident reports and compliance checklists	2	3	-	1
	PC9. identify and mitigate hazards associated with installation sites, such as confined spaces, sharp edges, and high temperatures	2	2	-	1
	PC10. examine and safely handle pre-terminated fiber assemblies and connectors to prevent contamination or damage	1	2	-	1
	PC11. apply safe cable routing techniques to avoid damage to existing infrastructure, such as gas pipelines, electrical cables, and water pipelines	1	2	-	1
	<i>Industry standards and guidelines</i>	10	20	-	5
	PC12. follow national and international guidelines for fiber optic installations, such as TIA/EIA-568, ITU-T standards, and BICSI guidelines	4	8	-	2
	PC13. comply with regulatory and environmental norms related to FTTH/X deployment, including e-waste management	3	6	-	2
	PC14. identify and report non-compliance issues or deviations from industry standards to the supervisor	3	6	-	1
	Total Marks	30	50	-	20
	TEL/N9111: Follow sustainability practices in telecom cabling operations				
	<i>Identify recyclable, reusable, and hazardous materials</i>	8	15	-	5
	PC1. identify different types of materials used in cabling operations, such as optical fiber, connectors, protective ducts, and joint enclosures	2	3	-	1
	PC2. segregate materials into recyclable (e.g., plastic ducts, fiber offcuts, packaging), reusable (e.g., spare connectors, splitters), and hazardous (e.g., lead-based cables, old batteries, chemical adhesives) categories	2	3	-	1
	PC3. follow workplace procedures for storing recyclable materials separately from hazardous and general waste	2	3	-	1
	PC4. label and store hazardous waste safely to prevent contamination or accidents during handling and disposal	1	3	-	1
	PC5. ensure all recyclable and hazardous waste is recorded in logs for traceability and compliance	1	3	-	1
	<i>Follow waste management, recycling, and disposal protocols</i>	6	15	-	5
	PC6. adhere to applicable SOPs for safe handling and disposal of non-recyclable and hazardous materials, such as fiber shards, cable sheaths, and chemical adhesives	2	3	-	1
	PC7. coordinate safe disposal of waste materials at designated collection points or through approved vendors, as per organizational policies and environmental guidelines	1	3	-	1

	PC8. reduce waste by minimizing excess material use and reusing components wherever possible	1	3	-	1
	PC9. maintain clean and organized work sites to prevent environmental contamination and promote workplace safety	1	3	-	1
	PC10. check for and report any issues related to improper waste disposal, unauthorized dumping, or environmental hazards to the relevant authority	1	3	-	1
	<i>Optimize material and energy usage in cabling work</i>	8	10	-	5
	PC11. plan cabling work to minimize material wastage by accurately measuring fiber optic lengths, ducts, and accessories before cutting or installing	2	2	-	1
	PC12. use energy-efficient tools and machinery where possible, ensuring minimal power consumption without compromising work efficiency	2	2	-	1
	PC13. ensure proper maintenance of cabling tools and equipment to reduce unnecessary repairs and replacements that contribute to waste	2	2	-	1
	PC14. optimize the use of trenching and ducting by following efficient layout designs to minimize excavation and reduce material consumption	1	2	-	1
	PC15. use and promote eco-friendly materials (such as low-impact protective coatings and biodegradable packaging) wherever feasible	1	2	-	1
	<i>Comply with environmental and regulatory standards</i>	8	10	-	5
	PC16. follow national and local environmental laws, regulations, and workplace policies related to telecom cabling operations	2	2	-	1
	PC17. maintain proper documentation of sustainability-related activities, including logs of disposed and recycled materials, to meet regulatory and audit requirements	2	2	-	1
	PC18. conduct periodic self-audits to verify compliance with environmental policies	2	2	-	1
	PC19. educate team members on best practices for sustainability, including waste segregation, material reuse, and responsible energy consumption	1	2	-	1
	PC20. report any violations of environmental policies, hazardous material spills, or unsafe disposal practices to the designated supervisor or regulatory body	1	2	-	1
	Total Marks	30	50	-	20
DGT/VSQ/N0101: Employability Skills (30 Hours)	<i>Introduction to Employability Skills</i>	1	1	-	-
	PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
	<i>Constitutional values – Citizenship</i>	1	1	-	-
	PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
	<i>Becoming a Professional in the 21st Century</i>	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 cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
	<i>Basic English Skills</i>	2	3	-	-
	PC4. speak with others using some basic English phrases or sentences	-	-	-	-
	<i>Communication Skills</i>	1	1	-	-
	PC5. follow good manners while communicating with others	-	-	-	-

PC6. work with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	1	-	-
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
<i>Financial and Legal Literacy</i>	3	4	-	-
PC9. use various financial products and services safely and securely	-	-	-	-
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
<i>Essential Digital Skills</i>	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	-	-	-	-
<i>Entrepreneurship</i>	3	5	-	-
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
<i>Customer Service</i>	2	2	-	-
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	1	3	-	-
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
Total Marks	20	30	-	-
Grand Total	200	330	-	120

Annexure 7: Assessment Strategy

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

Mention the detailed assessment strategy in the provided template.

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.

Annexure 8: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training
TSSC	Telecom Sector Skill Council
TRAI	Telecom Regulatory Authority of India
FTTx	Fiber to the x
FTTN	Fiber to the Node
FTTC	Fiber to the Curb
FTTB	Fiber to the Building
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

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.

Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf

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