

Model Curriculum

1. Optical Fibre Technician

SECTOR: TELECOM

SUB-SECTOR: NETWORK MANAGED SERVICES

OCCUPATION: NETWORK OPERATIONS & MAINTENANCE – OPTICAL

REF ID: TEL/Q6401

NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

TELECOM SECTOR SKILL COUNCIL

For the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/Qualification Pack: 'Optical Fibre Technician' QP No. 'TEL/Q 6401 NSQF Level 4'

Date of issuance: April 9th, 2016

Valid up to*: April 10th, 2018

*Valid up to the next review date of the Qualification Pack or the
'Valid up to' date mentioned above (whichever is earlier)



Authorised Signatory
(Telecom Sector Skill Council)

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Optical Fibre Technician

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Optical Fibre Technician”, in the “Telecom” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Handset Repair Engineer (Level II)		
Qualification Pack Name & Reference ID. ID	TEL/Q6401, v1.0		
Version No.	1.0	Version Update Date	31-05-2017
Pre-requisites to Training	<ul style="list-style-type: none"> • Class VIII / ITI/Diploma/Bachelor in Technology (any field) • Technical training on standard splicing process for both underground and overhead cables, Interpreting the colour coding to avoid cross fibre (preferably) 		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Acquaint self with facets of trenching, laying, jointing and blowing of cables by: authenticating and confirming cable drum is placed near site, cable marking is as per guideline, trenching is according to the route plan • Comprehend inspecting criteria of route plan, clearance, schedule and patrolling by: acquiring route plans, their clearance and check for safety of the site for cable installation • Identify importance of fault maintenance, maintenance of POPs and Repairs to OFC by: compliance to enterprise policy, coordinate with NOC and carry out planned maintenance. • Aggregate potential knowledge and skill to vouchsafe the importance of health and safety by: safeguard compliance of safety regulations, personal protection and environmental conditions. • Comprehend and initiate the importance of report and record by: ensuring cable id, cable markings, drum numbers, OTDR findings are Documented for future reference. 		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Optical Fibre Technician” Qualification Pack issued by “Telecom Skill Council of India”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction</p> <p>Theory Duration (hh:mm) 25:00</p> <p>Practical Duration (hh:mm) 00: 00</p> <p>Corresponding NOS Code NA</p>	<ul style="list-style-type: none"> Understand the opportunities in the broadband industry and the role of optical fiber technician Gain knowledge about the basics of telecom – Public switched telephone network (PSTN), media of transmission, important telecom terminologies etc. Basics of fibre optic communication including its evolution 	Laptop, white board, marker, projector
2	<p>Installation & Commissioning of Optical fiber cables (OFC)</p> <p>Theory Duration (hh:mm) 35:00</p> <p>Practical Duration (hh:mm) 44:00</p> <p>Corresponding NOS Code TEL/N6402</p>	<ul style="list-style-type: none"> Conduct an effective site visit Understand, conduct and supervise an effective route inspection Understand advantages of an effective rout inspection Identify, understand and follow steps of route inspection Identify, list and maintain a complete list of fibre optic tools and tool kit Understand benefits and use of fibre optic cable specification – tensile strength, bend radius, crush and impact, cable attenuation, fibre optic connectivity Identify and ascertain factors effecting fibre optic cable – natural and man made Handle optical fibre cable – unloading, unwrapping, storage, drum preparation and opening Demonstrate and execute optical fibre laying pre-requisites Conduct and supervise installation of optical fibre – trenching, aerial cabling, ducting, figure-eight, cable pulling, blowing and termination Report and document the troubleshooting steps taken 	Test Equipment – Fiber Optic Power Meter, Fiber Optic Test Source, Adapters for Power Meter (for various types of optical cables), OTDR, Cable Cutter, Cable Splitter, Reference Test Cables,

Sr. No.	Module	Key Learning Outcomes	Equipment Required
3	<p>Conditional Maintenance & Planned repair activities</p> <p>Theory Duration (hh:mm) 35:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code TEL/N6403</p>	<ul style="list-style-type: none"> • Test OFC for continuity, insertion loss and troubleshooting • Test OFC using optical inspection microscope • Test OFC using OTDR • Test OFC using visual fault locator • Conduct bare fibre testing • Identify and understand splicing, its purpose and its benefits • Perform mechanical and fusion splicing 	<p>Splicing Tools - Cable Jacket Stripper, Connector Crimper, Fiber optic stripper, Fiber Scribe, Tweezers, Cleaver, Polishing puck for connectors, Polishing Plate, Black work mats, Fusion Splicer (Splicing machine),</p>
4	<p>Corrective Maintenance & Optical Faults Restoration</p> <p>Theory Duration (hh:mm) 35:00</p> <p>Practical Duration (hh:mm) 35:00</p> <p>Corresponding NOS Code TEL/N6404</p>	<ul style="list-style-type: none"> • Understand and follow NOC fault notifications process • Respond to faults received from customer, contractor • Understand and take adequate steps to fault localization and rectification • Identify typical faults and adhere to problem identification process • Carry out optical fibre restoration process • Understand and follow various work instructions • Carry out corrective and preventive maintenance as per defined process. • Report and document the maintenance procedures 	<p>Consumables – Terminations, Connectors, Splices, Splice Protectors, Splice trays</p>
5	<p>Optical Fibre Health & Safety</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 06:00</p> <p>Corresponding NOS Code NA</p>	<ul style="list-style-type: none"> • Outline and follow precautions needed while handling optical fibre • Outline and follow precautions needed while handling optical laser • Outline and follow precautions related to optical fibre fire safety • Outline and follow precautions to be taken Optical fibre workmanship safety • Outline and follow the safety equipment required by the optical fibre workman and some important safety guidelines 	<p>First Aid Kit and Safety equipment's</p>
6	<p>Soft Skills</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm)</p>	<ul style="list-style-type: none"> • Organise self by following organisational grooming guidelines/standards • Communicate well with Supervisors, fellow workers and customers • Know the time wasters at work and better manage your work schedule • Practice problem skills in your day to day life 	<p>Laptop, white board, marker, projector</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	05:00 Corresponding NOS Code NA		
	Total Duration Theory Duration 150:00 Practical Duration 150:00	Unique Equipment Required: black/ white board, marker, projector system with PC/Laptop	

Grand Total Course Duration: 300 Hours, 0 Minutes

(This syllabus/ curriculum has been approved by [Telecom Sector Skill Council](#))

Trainer Prerequisites for Job role: “Optical Fibre Technician” mapped to Qualification Pack: “TEL/Q6401, v1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “TEL/Q6401”, Version No. 1.0.
2	Personal Attributes	Personal Attributes: This job requires the individual to work closely with multiple teams and operate in field which may consist of difficult terrain. The individual should be able to handle high pressure situations and be analytical to successfully perform the assigned responsibilities. It is preferred that individual is well versed with local language to coordinate with local labors.
3	Minimum Educational Qualifications	Preferably equivalent to Diploma in Fiber Optics
4a	Domain Certification	Certified for Job Role: “Optical Fiber Technician” mapped to QP: “TEL/Q6401” Version No. 1.0. Minimum accepted score as per respective TSSC guidelines.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “TEL/Q6401” Version No. 1.0. Minimum accepted score as per respective TSSC guidelines.
5	Experience	<ul style="list-style-type: none"> • The trainer should be certified by TSSC as ‘Train the Trainer’ and Assessor and • Worked as Optical fiber technician for minimum 4-5 years if educational qualification is ITI/ Diploma or • Worked as optical fiber technician for 2-3 years if educational qualification is Bachelor in Technology (BTech and BE)

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Optical Fibre Technician
Qualification Pack	TEL/Q6401, v1.0
Sector Skill Council	Telecom

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. TSSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the TSSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre(as per assessment criteria below)
4	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
5	To pass the Qualification Pack, every trainee should score 70% overall.
6	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessable Outcomes	Assessment Criteria	Total Mark (300)	Total of Sub-Element	Out Of	Theory	Skills Practical	
1. TEL/N6402 (Co-ordinate Installation & Commissioning of Optical fiber cables)	Carry out Inspection of route plan and obtain necessary clearances	100	10	2	2	0	
				1	1	0	
				1	1	0	
				3	3	0	
				1	1	0	
				2	2	0	
	Arrange for tools and spares		5	2	2	0	
				2	2	0	
				1	1	0	
	Coordinate trenching, cable laying, jointing and cable blowing activities			50	1	1	0
					3	0	3
					2	2	0
			4		1	3	
			4		2	2	
			3		1	2	
			5		2	3	
			3		0	3	
			5		2	3	
			4		1	3	
			1		0	1	
			2		1	1	
2		0	2				
1		1	0				
1	1	0					
1	1	0					

		PC18. ensure appropriate optical connectors are used as per the terminating equipment requirements			2	0	2
		PC19. verify if ducts require additional protection like cover of RCC pipes, chambering and concreting based on site location and terrain			2	0	2
		PC20. ensure installation activity is completed within the defined SLAs			1	1	0
		PC21. ensure timely completion of work by monitoring activities performed by the labour workers and optical splicers			1	1	0
		PC22. ensure compliance to enterprise policy while escalating instances of delays			1	1	0
	Test effectiveness & close activity	PC1. ensure use of appropriate color for the route indicators and joint indicators as per standards		15	3	1	2
		PC2. ensure splices are within the quality assurance/ AT standards			1	1	0
		PC3. test the joint for transmission loss and strength and re-terminate the joint if the transmission loss exceeds the manufacturer's specifications			3	1	2
		PC4. ensure backfilling and crowning in coordination with the labour workers as per standard requirements			1	0	1
		PC5. ensure stone marker at the jointing pit has to be provided for identification of route as well as jointing pit			2	0	2
		PC6. ensure appropriate cable markings as per guidelines			2	1	1
		PC7. ensure updation of As-build documents based on joint location and installed fibre route			2	1	1
		PC8. clear sites from debris and other items			1	0	1
	Health and Safety	PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces		15	1	0	1
		PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms			2	2	0
		PC3. ensure that work is carried out in accordance to the level of competence and legal requirements			2	2	0
		PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work			2	2	0
		PC5. ensure compliance to health and safety guidelines by optical splicer and installation labour workers			2	2	0
		PC6. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required			2	0	2
		PC7. ensure environmental conditions and hazards like Earth Potential Rise (EPR) are considered while carrying out the work			2	0	2
		PC8. ensure adherence to emergency plans in case of safety incidents			1	1	0
		PC9. ensure escalation of safety incidents to relevant authorities as per guidelines legal requirements			1	1	0
	Report and Records	PC1. ensure cable id/ make and drum numbers are recorded for future fault localization		5	1	1	0
		PC2. ensure OTDR finding are documented & summary of tests are shared with appropriate teams			2	2	0
		PC3. obtain sign-off from the projects team and communicate status to NOC for cable integration			1	1	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			1	1	0
					100	55	45
2. TEL/N6403 (Undertake Condition)	Obtain maintenance schedule and	PC1. ensure As-build drawing is obtained from the NOC/ supervisors and identify the OFC route assigned for maintenance	100	10	1	1	0

based Maintenance & Planned repair activities)	patrol assigned route section	PC2. ensure availability of optical test tools like OTDR, Power meter, Light meter			2	2	0	
		PC3. ensure patrolling and surveillance of OFC route as per the maintenance plan			1	1	0	
		PC4. ensure monitoring of jobs undertaken by other agencies in the vicinity of OFC network to ensure the safety of OFC cable			2	2	0	
		PC5. coordinate and liaise with authorities for checking for any planned construction/ activity in the vicinity of the OFC			1	1	0	
		PC6. ensure sample check of as-built drawings			1	1	0	
		PC7. ensure changes to as-built drawings are communicated to the NOC/ supervisors for updating the document			2	2	0	
	Arrange for tools and spares	PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests			5	1	0	1
		PC2. ensure availability of optical equipments like spool, joint closure, connectors, splicers and cleaver			1	0	1	
		PC3. ensure inputs based on test results are provided to planning team for developing route strengthening workplans			1	1	0	
		PC4. ensure calibration status of equipments to be used (eg.splicing machine, OTDR, power meter, cleaver)			2	1	1	
	Carry out maintenance testing of dark/ spare OFC	PC1. ensure performance of OTDR, Power Meter tests for all the dark/ spare fibers as per required periodicity			25	9	5	4
		PC2. ensure testing of end-to-end link for adherence to link budget and identify loss and reflection points			7	4	3	
		PC3. ensure inputs based on test results are provided to planning team for developing route strengthening workplans			9	6	3	
	Carry out planned repairs to the OFC	PC1. coordinate with Network Operating Centre (NOC) prior to undertaking the planned repair activities and obtain time block for carrying out the activity			25	5	3	2
		PC2. ensure that the planned repair activities are completed within the defined timelines			3	0	3	
		PC3. confirm effectiveness of the planned repair process by carrying out optical tests on spare fibers			5	3	2	
		PC4. in case, active fibers are to be used for testing, fibres are to be used, ensure precautions are taken with regard to the power launched on to the fibre			6	3	3	
		PC5. ensure installation activity is completed within the defined SLAs			2	2	0	
		PC6. ensure compliance to enterprise policy while escalating instances of delays			2	2	0	
		PC7. ensure timely escalation of emergency/ unresolved issues according to established Company's procedure			2	2	0	
	Carry out maintenance of equipments at Points of Presence (POP)	PC1. conduct periodic (monthly, quarterly, half yearly) maintenance activities			15	1	1	0
		PC2. ensure completion of physical maintenance tasks like checking battery voltage levels, electrolyte levels; DG set auto-start, oil levels; Air conditioner gas level, filter condition; Earthing, Fire alarm system and other power equipments (including MCBs)			5	2	3	
		PC3. ensure general upkeep of co-located electronic equipments and ensure testing of alarms in coordination of NOC			2	2	0	
		PC4. ensure that live/ working fibres are not disturbed while testing			2	2	0	
		PC5. carry out planned repairs to existing joints and terminations in co-ordination with NCC for improvement of link margin			3	2	1	

		PC6. ensure that for 3rd party elements that require maintenance, tickets are raised to the respective vendors by the NOC team			2	1	1
	Health and Safety	PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces	15		2	0	2
		PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms			2	2	0
		PC3. ensure that work is carried out in accordance to the level of competence and legal requirements			2	2	0
		PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work			2	2	0
		PC5. ensure compliance to health and safety guidelines by optical splicer and installation labour workers			2	2	0
		PC6. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required			2	0	2
		PC7. ensure environmental conditions and hazards like Earth Potential Rise (EPR) are considered while carrying out the work			2	0	2
		PC8. ensure escalation of safety incidents to relevant authorities as per guidelines legal requirements			1	1	0
		Report and Records			PC1. ensure completion of Patrolling register showing complete log in chronological order Kilometer wise of the patrolling in the section	5	
	PC2. ensure completion of OFC/OTDR register showing complete record of all fibers tests		1	1	0		
	PC3. keep account of diesel oil at respective stations and ensure maintenance of assets register for sites under supervision		1	1	0		
	PC4. ensure summary of OTDR finding is to be made & sent to the respective territory manager for planning and monitoring cable improvement works		1	1	0		
	PC5. ensure that documents are available to all appropriate authorities to inspect		1	1	0		
					100	66	34
3. TEL/6404 (Perform corrective maintenance / restoration of optical faults)	Handling fault notifications on prompt basis	PC1. receive fault notification from NOC/ supervisors/ customers and obtain details of response time/ SLAS	15		7	4	3
		PC2. ensure that latest As-build drawing is obtained from the NOC/ supervisors			8	4	4
	Arrange for tools and spares	PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests	5		1	0	1
		PC2. ensure availability of optical equipments like spool, joint closure, connectors, splicers and cleaver			1	0	1
		PC3. ensure that faulty equipments are sent to logistics team for repair and replacement			1	1	0
		PC4. ensure calibration status of equipments to be used (eg.splicing machine, OTDR, power meter, cleaver)			2	1	1
	Fault localization and rectification	PC1. visit nearby POP location/ node and carry out OTDR tests on spare fiber using spool fiber if required, to identify exact location of fault	60		7	4	3
		PC2. refer the As-build drawing to locate the physical site on the ground			5	3	2
		PC3. coordinate excavation, pulling of appropriate cables (if feasible) and preparation of jointing pit at site through labour workers			6	4	2
		PC4. coordinate with optical splicer to carry out splicing as per standard process			7	3	4
		PC5. ensure effectiveness of the jointing activity by reviewing OTDR and power test results			7	4	3

		PC6. ensure joints are protected and strengthened appropriately using couplers, sleeves and FRPs as required			5	3	2
		PC7. verify if ducts require additional protection like cover of RCC pipes, chambering and concreting based on site location and terrain			6	3	3
		PC8. coordinate back-filling of the trench through labor workers			6	3	3
		PC9. ensure rectification of network problem/ fault within the alarm SLAs			4	3	1
		PC10. ensure timely completion of work by monitoring activities performed by the labour workers and optical splicers			4	2	2
		PC11. ensure compliance to enterprise policy while escalating unresolved faults/ instances of delays			3	2	1
	Health and Safety	PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces		15	2	0	2
		PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms			2	2	0
		PC3. ensure that work is carried out in accordance to the level of competence and legal requirements			2	2	0
		PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work			2	2	0
		PC5. ensure compliance to health and safety guidelines by optical splicer and installation labour workers			2	2	0
		PC6. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required			2	0	2
		PC7. ensure environmental conditions and hazards like Earth Potential Rise (EPR) are considered while carrying out the work			2	0	2
		PC8. ensure escalation of safety incidents to relevant authorities as per guidelines legal requirements			1	1	0
	Report and Records	PC1. ensure appropriate cable marking and Installation of chamber & route marker for direction and route identification		5	1	1	0
		PC2. ensure preparation of jointing record for future reference			2	2	0
		PC3. ensure that documents that are required to be updated are identified			1	1	0
		PC4. ensure completion of OTDR register showing complete record of jointing tests			1	1	0
					100	58	42
		Grand Total		300	300	179	121
		Percentage Weightage:				50%	50%
		Minimum Pass% to qualify (aggregate):				70%	