

Model Curriculum

Network Engineer

SECTOR: TELECOM

SUB-SECTOR: Network Managed Services

OCCUPATION: Operation and Maintenance

REF ID: TEL/Q6209

NSQF LEVEL: 4



Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

TELECOM SECTOR SKILL COUNCIL

for

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**NETWORK ENGINEER**'
QP No. '**TEL/ Q6209 NSQF Level 4**'

Date of issuance: **June 15th, 2016**

Valid up to: **March 31st, 2018**

* Valid up to the next review date of the Qualification Pack

Authorised Signatory
(Telecom Skill Development Council)

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Network Engineer

CURRICULUM / SYLLABUS

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

Program Name	Network Engineer		
Qualification Pack Name & Reference ID. ID	TEL/Q6209		
Version No.	1.0	Version Update Date	
Pre-requisites to Training	Diploma/ITI		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Install and configure network software including operating systems, firewalls, monitoring and management tools • Rectify the faults and test effectiveness of the troubleshooting • Monitor and report network issues • Test and evaluate the performance of network 		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Network Engineer” Qualification Pack issued by “Telecom Sector Skill Council of India”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Overview</p> <p>Theory Duration (hh:mm) 25:00</p> <p>Practical Duration (hh:mm) 00:00</p> <p>Corresponding NOS Code Bridge Module</p>	<ul style="list-style-type: none"> • Introduction to data communication networks such as LAN and WAN systems • Basic concept of firewalls, routers, switches, WI-FI and access points • Configuration of routing and switching equipment • Different routing protocols TCP/IP, UDP, Telnet etc. • Basic knowledge of IP addressing both IPV4 & IPV6 • Knowledge of different ways of configuring access list 	Laptop, white board, marker, projector
2	<p>Key concepts</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 05:00</p> <p>Corresponding NOS Code NA</p>	<ul style="list-style-type: none"> • Explain the various mobile and data technologies • Know and understand the various product and service offerings in the telecom sector • Outline the documentation process and documents needed for mobile customers • Explain the key concepts related to Networking • State the importance of workplace • Ergonomics and respect at workplace • Express the importance of data confidentiality in the telecom industry 	Laptop, white board, marker, projector
3	<p>Establishment of network Infrastructure</p> <p>Theory Duration (hh:mm) 25:00</p> <p>Practical Duration (hh:mm) 25:00</p> <p>Corresponding NOS Code TEL/N6231</p>	<ul style="list-style-type: none"> • Identify the network infrastructure requirement • Plan the activities for network installation, implementation & handover • Knowledge of network infrastructure including configuring network hardware, software, routers, bridges, devices and interfaces • Know how to install and configure network software including operating systems, firewalls, monitoring and management tools • Know the test and evaluation procedure for the performance of network • Understand the implementation of handover sign off by the authorized person • Learn the basic operating policies and procedures 	Laptop, white board, marker, projector, Network management tools, Diagnostic tools, Test equipment: line tester, Ethernet tester, VSWR meter, RF power meter, Optical meter
4	<p>Perform preventive maintenance and monitoring the network</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 25:00</p>	<ul style="list-style-type: none"> • Understand about the monitoring of network infrastructure services • Know how to apply diagnostic tools and techniques to identify network service level issues and causes • Learn how to carry out inspection of network devices based on maintenance schedule • Understand how to generate the network reports as per customer requirement 	Network management tools, Diagnostic tools, Cables: RJ45, RS232 and Hi-Speed USB, Test equipment: line tester, Ethernet tester,

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code TEL/N6232	<ul style="list-style-type: none"> Learn how to carry out planned hardware and software upgradations Know how to obtain sign-off from the customer as per required documentation 	VSWR meter, RF power meter, Optical meter
4	Technical Knowledge and skills Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code TEL/N6231 TEL/N6232 TEL/N6233 TEL/N4121	<ul style="list-style-type: none"> Understand the basic concepts of IP addressing format for IPV4 & IPV6 Knowledge of different network protocols TCP/IP, UDP, Telnet etc. Understand the different ways of configuring access-list Knowledge of LAN, VLAN and their limitations Understand the tools and techniques for network management & support Knowledge of Organisational network topology including all wired /wireless media devices, firewalls & industry network standards Usability of various network management systems Knowledge of network protocol standards used by networked devices for communication 	Laptop, white board, marker, projector
5	Perform corrective maintenance Theory Duration (hh:mm) 15:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code TEL/N6233	<ul style="list-style-type: none"> Learn how to monitor and administer computer network using various Network Management Systems (NMSs) Ensure the traffic gets diverted to backup link if primary link goes down Follow the organization's policies, procedures and guidelines for Network maintenance & troubleshooting Learn how to do load balancing and storage protocols 	Cables: RJ45, RS232, Hi-speed USB, console cable, Network Management tool or software
7	Troubleshooting and testing effectiveness Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 35:00 Corresponding NOS Code TEL/N6233	<ul style="list-style-type: none"> Know how to handle the fault notifications on prompt basis Learn how to apply structured approach to network troubleshooting Know how to rectify and test effectiveness of the troubleshooting Record all network events by maintaining a network issues log Know how to register & file the remediation work carried out to resolve network issues Understand how to monitor & report network issues 	Cables: RJ45, RS232, Hi-speed USB, console cable, Network Management tool or software, Test equipment: line tester, Ethernet tester, VSWR meter, RF power meter, Optical meter
8	Health and safety Theory Duration (hh:mm) 05:00	<ul style="list-style-type: none"> Learn about General Safety while handling electrical/electronic devices Understand Proper use of PPE (Personal Protective Equipment's) 	Laptop, white board, marker, projector, Personal protection

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 10:00 Corresponding NOS Code TEL/N4121	<ul style="list-style-type: none"> Understand on Work Environment Area Protection Learn to escalate safety incidents to relevant authorities as per guidelines Identify and correct any hazards that you can deal with safely, competently and within the limits of your authority follow your organization's emergency procedures promptly, calmly, and efficiently 	equipments like anti-static bands, harness, belts and helmets
9	Program Wrap Theory Duration (hh:mm) 05:00 Practical Duration (hh:mm) 10:00 Corresponding NOS Code NA	<ul style="list-style-type: none"> Understand what is an interview Develop the skills to participate in an interview effectively Know commonly asked questions in an interview Revise and integrate learning's of the training program 	Presentation on soft skills and entrepreneurship
	Total Duration Theory Duration 120:00 Practical Duration 180:00	Unique Equipment Required: Laptop, white board, marker, projector	

Grand Total Course Duration: **300Hours, 0 Minutes**

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

Trainer Prerequisites for Job role: “Network Engineer” mapped to Qualification Pack: “TEL/Q6209, v1.0”

Sr. No.	Area	Details
1	Description	Individuals at this job responsible for establishing network infrastructure. Carry out preventive maintenance of the network by ensuring connectivity is always maintained & is error and loop free. Individual should be able to perform corrective maintenance & troubleshooting during network failure.
2	Personal Attributes	A trainer should be willing to work on-field and be able to handle high pressure situations. He should be adaptable to changing work environments and have good practical knowledge to successfully perform the assigned responsibilities
3	Minimum Educational Qualifications	Graduate in Science /Engineering/Technology - Electronics, Computer Science and IT
4a	Domain Certification	Certified for Job Role: “ Network Engineer” mapped to QP: “ <u>TEL/Q6209, v1.0</u> ”. Minimum accepted score is 80%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “TEL/Q6209”. Minimum accepted % as per respective SSC guidelines is 80%.
5	Experience	Minimum 1 year

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Network Engineer
Qualification Pack	TEL/Q6209
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. SSC 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 SSC.
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 evaluations for skill practical for every student at each examination/training center based on these criteria.
5	To pass the Qualification Pack, every trainee should score a minimum of 40% in every NOS and 50% 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 Outcome	Assessment Criteria	Total Mark (400)	Out Of	Theory	Skills Practical
1. TEL/N6231 (Establishment of Network Infrastructure)	PC1. Identifying the Network Infrastructure, service level & network support requirements	100	10	5	5
	PC2. Identify & document activities for Network installation, implementation & handover		20	10	10
	PC3. Physical realization of network Infrastructure including configuring network hardware, software, switches, routers, bridges, devices & interfaces		20	5	15
	PC4. Install & configure network software including operating systems, firewalls, monitoring & management tools		20	10	10
	PC5. Testing & Evaluating the performance of network		10	10	0
	PC6. Network infrastructure implementation handover sign off by the authorized person		10	10	0
	PC7. Support in creation of operating policies & procedures		10	10	0
			100	60	40
2. TEL/N6232 (Perform Preventive Maintenance)	PC1. Monitor network infrastructure services using network management tools		20	10	10
	PC2. Apply diagnostic tools & techniques to identify network service level issues & causes		15	10	5
	PC3. Produce network reports as per customer requirement		10	5	5

	PC4. carry out inspection of Network devices based on maintenance schedule	100	10	5	5
	PC5. carry out planned hardware & software upgradations		25	10	15
	PC6. Obtain sign-off from the customer as per required documentation		10	10	0
	PC7. Support in creation of operating policies & procedures		10	10	0
			100	60	40
3.TEL/N6233 (Perform Corrective Maintenance & Troubleshooting)	PC1. monitor and administer a computer network using various Network Management Systems (NMSs)	100	15	5	10
	PC2. Handling the fault notifications		15	5	10
	PC3. Apply structured approach to Network troubleshooting		20	10	10
	PC4. Rectification and testing effectiveness of the troubleshooting		20	10	10
	PC5. Recording all network events by maintaining a network issues log		10	5	5
	PC6. Register & file the remediation work carried out to resolve network issues		10	5	5
	PC7. ensure traffic gets diverted to backup link if primary link goes down.		10	5	5
			100	45	55
4.TEL/N4121 (Maintain a Healthy, Safe and Secure Working Environment)	PC1. ensure that work is carried out in accordance to the level of competence and legal requirements	100	10	6	4
	PC2. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work		12	6	6
	PC3. ensure environmental conditions and hazards like Earth Potential Rise (EPR) are considered while carrying out the work		15	9	6
	PC4. identify and correct any hazards that you can deal with safely, competently and within the limits of your authority		15	10	5
	PC5. report any hazards that you are not competent to deal with to the relevant person in line with organizational procedures and warn other people who may be affected		12	7	5
	PC6. follow your organization's emergency procedures promptly, calmly, and efficiently		12	6	6
	PC7. identify and recommend opportunities for improving health, safety, and security to the designated person		14	8	6
	PC8. complete any health and safety records legibly and accurately		10	5	5
		400	100	57	43