Model Curriculum

QP Name: Active Network Management Associate

QP Code: TEL/Q6302

QP Version: 2.0

NSQF Level: 5

Model Curriculum Version: 1.0

Telecom Sector Skill Council of India (TSSCI),
Estel House, 3rd Floor, Plot No:- 126, Sector 44
Gurugram, Haryana 122003

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Training Parameters

Sector	Telecom
Sub-Sector	Network Managed Services
Occupation	Project Engineering
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3114.1301
Minimum Educational Qualification & Experience	Diploma (Computer Science/Electrical/Electronics/Telecommunication) with 1-2 Years of experience in Switching and Routing
Pre-Requisite License or Training	Basic knowledge of OSI Layer, SDH, DWDM, active network and network routing
Minimum Job Entry Age	21 Years
Last Reviewed On	18/03/2021
Next Review Date	18/03/2026
NSQC Approval Date	TBD
Version	2.0
Model Curriculum Creation Date	18/03/2021
Model Curriculum Valid Up to Date	18/03/2026
Model Curriculum Version	1.0
Minimum Duration of the Course	600 Hours, 0 Minutes
Maximum Duration of the Course	600 Hours, 0 Minutes

Program Overview

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

Training Outcomes

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

- Identify the role, responsibilities and scope of work of an Active Network Management Associate
- Explain the provisioning of network management equipment
- Explain the monitoring and reporting the status of Synchronous Digital Hierarchy (SDH), Dense Wavelength Division Multiplexing (DWDM) and L2 equipment
- Discuss how to plan work effectively, implement safety practices and optimize use of resources
- Demonstrate how to communicate, develop interpersonal skills and become gender and Person with Disability (PwD) sensitive.

Compulsory Modules

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

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**16:00**	**00:00**	-	-	**16:00**
Module 1: Role and Responsibilities of an Active Network Management Associate	16:00	00:00	-	-	16:00
TEL/N6307 – Provisioning of Active Network Equipment **NOS Version No. 2.0** **NSQF Level 5**	**160:00**	**220:00**	-	-	**380:00**
Module 2: Provisioning of Active Network Equipment	160:00	220:00	-	-	380:00
TEL/N6309 – Monitoring and Reporting the Status of SDH, DWDM and L2 Equipment **NOS Version No. 2.0** **NSQF Level 5**	**72:00**	**52:00**	-	-	**124:00**
Module 3: Monitoring and Reporting the Status of SDH, DWDM and L2 Equipment	72:00	52:00	-	-	124:00
TEL/N9103 – Implement effective interaction between team members and customers **NOS Version No. 1.0**	**16:00**	**24:00**	-	-	**40:00**

NSQF Level 5					
Module 4: Communication and Interpersonal skills	16:00	24:00	-	-	40:00
TEL/N9104 – Manage work and safety at workplace **NOS Version No. 1.0** **NSQF Level 5**	**16:00**	**24:00**	**-**	**-**	**40:00**
Module 5: Manage Work, Resources and Safety at Workplace	16:00	24:00	-	-	40:00
Total Duration	**280:00**	**320:00**	-	-	**600:00**

Module Details

Module 1: Role and Responsibilities of an Active Network Management Associate
Bridge Module

Terminal Outcomes:

- Identify the role and responsibilities of an Active Network Management Associate.

Duration: *16:00*	**Duration**: *00:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the size and scope of the Telecom industry and its various sub-sectors. • Define the basics of networking and related concepts such as networking components and working of a network. • Discuss the various opportunities for an Active Network Management Associate in the Telecom industry. • List the role and responsibilities of an Active Network Management Associate. • Analyse the organisational policies on incentives, delivery standards, personnel management and public relations (PR) pertinent to the job role. • Discuss the importance of seeking help from experts during any stage of main activity in order to avoid any escalation. • Discuss how to comply with security policies of the network operator such as access control, authentication, nonrepudiation, data confidentiality, etc.	
Classroom Aids:	
Laptop with software like MS Office and internet, white board, marker, projector	
Tools, Equipment and Other Requirements	

Module 2: Provisioning of Active Network Equipment

Mapped to TEL/N6307 v1.0

Terminal Outcomes:

- Analyse the pre-requisites for provisioning
- Perform provisioning using the NMS
- Provide ethernet services
- Report and record provisioning

Duration: *160:00*	**Duration: *220:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the networking equipment specifications and system requirements for configuration. • Explain how to launch Network Management System (NMS) with credential provided for GUI. • Define Software-Defined Networking (SDN) or DWDM with its applications. • Explain different amplifier modules and Erbium-Doped Fiber Amplifier (EDFA). • Discuss how to select amplifier gain and amplifier type for DWDM networks. • Elaborate on the implementation of Dynamic Circuit Network (DCN) management amplification. • Describe how to select transmission cards based on even or odd channel multiplexing and channel spacing. • Discuss the importance of providing correct DWDM SFPs in the Multiple Dwelling Units (MDU) cards for multiplexing performance. • Emphasize the importance of providing express channels in transmission cards for proper pass-through of other channels. • Examine client's small form-factor pluggable (SFPs) as per requirements. • Explain Plesiochronous Digital Hierarchy (PDH), SDH, Virtual Concatenation Group (VCG) circuit types. • Discuss the test results to find faults and provide resolutions. • List the basic requirements for the protected circuit such as protected class of service menu, etc.	• Perform steps for provisioning and system support using node view. • Prepare a sample design of a network hierarchy, mapped to network view of Network Management System (NMS) and Element Management System (EMS). • Demonstrate how to install, configure and connect NMS server and client software/switch. • Demonstrate how to use spectrometer for checking gains as per requirements. • Perform steps to configure channels based on the applications of Reconfigurable Optical Add-Drop Multiplexer (ROADM). • Employ proper technique to configure NMS GUI to check its connectivity and layout using topology view. • Perform steps to configure, label and verify nodes and unprotected circuits. • Perform necessary steps to configure NMS as per the instructions specified in the reference guide. • Demonstrate how to connect the links between Ethernet and Layer 2 devices and also analyse the traffic flow between the two devices. • Perform steps to measure parameters such as Quality-of-service (QoS), Administration and Maintenance (OAM). • Employ proper technique to configure per hop behaviour and traffic conditioning profiles. • Demonstrate how to identify, deactivate/delete circuit from NMS and verify the same.

• Examine the protected circuit and filter them as per the guidelines. • Elaborate how to analyse the status of the circuit and activate them as per the instructions. • Describe different services such as point-to-point and point-to-multipoint services. • Explain how to use Ethernet services from the NMS GUI. • Discuss how to inform concerned parties about circuit provisioning, activation, deactivation or any other task related to circuits. • Explore the various risks and impact of not following defined work instructions/procedures. • Outline the reporting structure of incidents, trouble or emergencies such as system failures, etc. • Explain the basic network management concepts, elements such as OSI architecture, LAN-MAN-WAN-VLAN, TCP/IP, IP addressing, etc. • Expound the various applications of NMS and configuration of server and client. • Explain PDH, SDH technology, mapping and multiplexing technology of SDH, ROADM and cross-connects. • Describe basic equipment design and application of network system, optical fiber transmission. • Outline TMF814 Multi-Technology Network Management (MTNM) Solution Set standards. • Discuss the functions of attenuators, test equipment, line tester, Ethernet tester, VSWR meter, RF power, etc. • Describe mapping and multiplexing technology of DWDM. • Discuss Ethernet networking, Ethernet media, Ethernet-over-SDH technology and connector requirement. • Explain core, distribution and access layer architecture. • Describe the basics of L2 switching technologies. • Discuss different WAN protocols.	• Record and update all the circuits and NMS records so that they are available at the time of inspection. • Demonstrate use of LINUX, MYSQL and simple Java commands. • Perform steps how to configure switches inside a network element.

• List login cables for different site equipment. • State common security aspects and lowest security levels of the components of the network. • Explain the working of different management frameworks in the NOC.	
Classroom Aids:	
Whiteboard and markers, chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Reference guide, manuals, user guides, login cables, report formats, NMS GUI, enterprise website or manufacturer's technical documentation, computers, hard drives, printers, phone systems, gateways, routers, network bridges, modems, wireless access points, networking cables, line drivers, switches, hubs, and repeaters	

Module 3: Monitoring and Reporting the Status of SDH, DWDM and L2 Equipment

Mapped to TEL/N6309 v1.0

Terminal Outcomes:

- Implement and support monitoring activities
- Resolve monitoring problems
- Discuss how to generate, review and analyse reports

Duration: *72:00*	**Duration**: *52:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the required hardware and software for launching Network Management system. • Explain the relevant links in NMS window for monitoring and reporting activities. • Discuss the steps to verify the network topology for connectivity of network elements. • Explain how to locate any deviation in NMS and record them in specified format. • Discuss how to locate root cause, provide solution to an issue within scope and escalate ones beyond scope for monitoring. • Discuss the queries from network team. • Describe the process to identify typical reports like circuit provisioning report, Dynamic Circuit Network (DCN) report and other customised reports. • Explain the limitations of generated reports and take corrective action. • Discuss the factors for potential bottlenecks after analysing reports. • Discuss the importance and types of documentation in organization. • List the records to be maintained and implication of non-maintenance. • Explain the application scenario of NMS, architecture and configuration of server and client. • Describe the alarm severity along with managing and filtering of alarms. • Discuss the concepts of cross-connects and fiber transmissions.	• Perform proper steps using the provided login credentials of NMS for monitoring network alarms. • Demonstrate how to monitor the status of Synchronisation Clock source and record performance management parameters in network elements. • Perform steps to identify and monitor critical parameters for network health. • Prepare a format to record monitoring activities. • Demonstrate how to generate individual as well as bulk reports according to the requirements. • Conduct the review of generated reports to verify correct network parameters recording. • Employ proper techniques for notifying authorities and sending generated reports.

• List the various formats in which the report needs to be generated like PDF, XML, HTML, DOC. • Explain the Operating System (OS) such as Windows and Linux/Unix, network management system server and client.	
Classroom Aids:	
Whiteboard and markers, chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Network Management System (NMS), user manual, different report formats, Automated network discovery, real time monitoring and alerting, powerful diagnostics, Enhanced network security, Configuration and log management	

Module 4: Communication and Interpersonal Skills

Mapped to TEL/N9103 v 1.0

Terminal Outcomes:

- Discuss how to communicate effectively
- Discuss how to develop interpersonal skills
- Explain the importance of gender and People with Disability (PwD) sensitization

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List organisational guidelines for dress code, time schedules, language and other soft skill aspects. • List the different methods of effective communication. • Explain the importance of effective communication and interpersonal skills. • Discuss the common reasons for interpersonal conflicts and ways of managing them effectively. • Discuss the need for implementing standards, guidelines and practices pertaining to gender sensitivity. • Explain the work ethics, workplace etiquette, standards and guidelines to make communication inclusive for all genders and PwD. • List the health and safety requirements mandatory and recommended at workplace for persons with disability. • List the rights, duties and benefits available at workplace for persons with disability. • Describe the process of recruiting people with disability for a specific job. • Discuss the specific ways to help persons with disability overcome the challenges.	• Demonstrate how to interact with superiors in terms of escalating problems, reporting work completion and receiving feedback. • Apply team building skills to assist colleagues in maximising effectiveness and efficiency of carrying out tasks. • Demonstrate appropriate communication skills and etiquettes while interacting with others. • Resolve conflicts with colleagues and adhere to commitment. • Demonstrate ideal workplace ethics while interacting with colleagues with respect to sharing information, co-ordinating work and showing respect. • Follow organisation's policy for working with team members. • Illustrate importance of team goals over individual goals. • Use inclusive language irrespective of the gender/ disability of the person. • Demonstrate appropriate behaviour towards all genders and differently abled people.
Classroom Aids	
Whiteboard and markers, chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 5: Manage Work, Resources and Safety at Workplace

Mapped to TEL/N9104 v 1.0

Terminal Outcomes:

- Plan work effectively, implement safety practices and optimize use of resources

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the recent skills and technologies prevalent in the telecom industry. • Describe the importance of conducting team building workshops and trainings. • Discuss some commonly occurring problems and their solutions with the team. • State the importance of keeping the workplace clean, safe and tidy. • Outline the organizational structure to assign duties and responsibilities to each team member. • State the procedure to report any breach in the organizational health, safety and security policy and hazards to the authorities. • List the types of hazards and the emergency procedures related with them. • Discuss the importance of sanitizing and disinfecting one's work area regularly. • State the ways to guide and supervise cleaning and efficient use of resources. • Describe the significance of conforming to basic hygiene practices such as washing hands, using alcohol-based hand sanitizers. • Illustrate some ways to cope with stress, anxiety etc. with the team members. • Discuss the ways of dealing with stress and anxiety during an epidemic or a pandemic. • Explain the ways to optimize usage of resources. • Evaluate various methods of waste management and its disposal. • Define the concepts of recyclable, nonrecyclable and hazardous waste.	• Prepare a time schedule for the tasks to make the team accountable. • Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs. • Demonstrate appropriate social and behavioural etiquette (greeting and meeting people, spitting/coughing/sneezing, etc.). • Employ different ways to check if equipment/machines are functioning as per requirements and report malfunctioning, if observed. • Employ ways for efficient utilization of material and water. • Use energy efficient electrical appliances and devices to ensure energy conservation.

• State the importance of using appropriate colour dustbins for different types of waste. • Examine the common sources of pollution and ways to minimize it. • Discuss different methods of cleaning, disinfection, and sanitization.	
Classroom Aids	
Whiteboard and Markers, Chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher and first aid kit	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI/Diploma	Electronics/Telecom/IT and other related field	3	Telecom	1	NA	Eligible for ToT Program

Trainer Certification	
Domain Certification	**Platform Certification**
Job Role: "Active Network Management Associate" "TEL/Q6302 v2.0", Minimum accepted score is 80%	Job Role: "Trainer", "MEP/Q2601" v1.0, Minimum accepted score is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI/Diploma	Electronics/Telecom/IT and other related field	3	Telecom	1	NA	Eligible for ToT Program

Assessor Certification	
Domain Certification	**Platform Certification**
Job Role: "Active Network Management Associate" "TEL/Q6302 v2.0", Minimum accepted score is 80%	Job Role: "Assessor" "MEP/Q2701"v1.0, Minimum accepted score is 80%

Assessment Strategy

1. Assessment System Overview:

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

2. Testing Environment:

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

3. Assessment Quality Assurance levels / Framework:

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

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

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

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

References

Glossary

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

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SOP	Standard Operating Procedures
CRM	Customer Relationship Management
AT	Acceptance Test
DG	Diesel Generator
PIU	Power Interface Unit
SMPS	Switch Mode Power Supply
FTP	File Transfer Protocol
BSC	Base Station Controller
AMF	Auto Man Failure
PPE	Personal Protective Equipment
FM	Field Maintenance
PwD	Persons with Disabilities
EB	Electricity Board
MCB	Miniature Circuit Breaker
NOC	Network Operating Centre
SLA	Service Level Agreement
PM	Preventive Maintenance
CM	Corrective Maintenance
TRX	Transceiver
NMS	Network Monitoring System

MOP	Maintenance Operation Protocol