Qualification Pack

IT Network Systems Administration

QP Code: TEL/Q6227

Version: 1.0

NSQF Level: 4.5

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Qualification Pack

TEL/Q6227: IT Network Systems Administration

Brief Job Description

The WorldSkills-Certified IT Network Systems Administrator installs, configures, and maintains network devices, operating systems, and enterprise IT services to ensure smooth business operations. An individual in this role monitors system performance, troubleshoots issues, and provide technical support to users. An IT Network Systems Administrator work across diverse environments such as data centers, ISPs, and network operations centers.

Personal Attributes

An IT Network Systems Administrator should be detail-oriented and analytical, with strong problem-solving skills and a proactive approach to identifying and resolving network issues. They should possess good communication skills, patience, and the ability to work effectively both independently and in a team. They must be adaptable to new technologies, remain calm under pressure, and demonstrate a high level of responsibility and integrity in maintaining secure and reliable systems.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. TEL/N6804: Maintain Work Organisation and Management
2. TEL/N6805: Communicate Effectively and Demonstrate Interpersonal Skills
3. TEL/N6806: Configure and Maintain Data Transfer Networks
4. TEL/N6807: Perform Network and System Operations
5. TEL/N6808: Implement Infrastructure Automation and Configuration Management
6. TEL/N6809: Troubleshoot IT Systems, Networks, and Services

Qualification Pack (QP) Parameters

Sector	Telecom
Sub-Sector	Network Managed Services
Occupation	Network Operation and Maintenance
Country	India

Qualification Pack

NSQF Level	4.5
Credits	15
Aligned to NCO/ISCO/ISIC Code	NCO-2015 / 2522.0100
Minimum Educational Qualification & Experience	Not Applicable
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	NA
Minimum Job Entry Age	16 Years
Last Reviewed On	NA
Next Review Date	06/02/2028
NSQC Approval Date	06/02/2026
Version	1.0
Reference code on NQR	QG-4.5-TL-05099-2026-V1-TSSC
NQR Version	1

Qualification Pack

TEL/N6804: Maintain Work Organisation and Management

Description

This NOS covers the competencies required to maintain an organised, safe, and efficient work environment while performing IT infrastructure tasks.

Scope

The scope covers the following :

- Maintain workplace health, safety, and equipment management
- Organise and manage work activities
- Support professional development and knowledge growth
- Collaborate and contribute to team-based work

Elements and Performance Criteria

Work Safety and Management

To be competent, the user/individual on the job must be able to:

PC1. Follow health and safety standards, rules, and regulations.

PC2. Maintain a safe working environment.

PC3. Identify and use the appropriate Personal Protective Equipment for ESD.

PC4. • Select, use, clean, maintain, and store tools and equipment safely and
• securely.

PC5. Plan the work area to maximise efficiency and maintain the discipline of regular tidying.

PC6. Regularly schedule, reschedule, and multitask according to changing priorities.

PC7. Work efficiently and check progress and outcomes regularly.

PC8. Undergo various certification requirements, such as Cisco, Microsoft, and Linux, specialising in at least one specific area.

PC9. Use thorough and efficient research methods to support knowledge growth

PC10. Be enthusiastic to try new methods, systems, and embrace change

PC11. • Collaborate effectively with work colleagues to maximise efficiency and
• learning.

PC12. Work effectively as a member of a project team.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. applicable organisational health, safety, and environmental (HSE) policies, statutory regulations, and compliance requirements relevant to IT infrastructure environments.

KU2. principles of workplace safety in server rooms, data centres, and office environments, including fire safety, electrical safety, and emergency procedures.

KU3. concept of Electrostatic Discharge (ESD), its impact on electronic components, and standard ESD control measures used in IT hardware handling.

KU4. types, purpose, and correct application of Personal Protective Equipment (PPE) and ESD protective gear used in network installation and maintenance activities.

KU5. operating principles, safe handling procedures, calibration needs, and storage requirements of common networking tools and test equipment.

KU6. importance of workspace layout planning, cable management standards, labelling norms, and housekeeping practices for operational efficiency and risk reduction.

KU7. fundamentals of work planning, task prioritisation, resource allocation, and workflow management in IT projects and support environments.

KU8. organisational procedures for progress tracking, documentation, reporting, and quality assurance in network administration tasks.

KU9. structure, scope, and relevance of industry certifications such as Cisco, Microsoft, and Linux-based certification frameworks, and their alignment with specialised roles.

KU10. principles of continuous professional development, skills mapping, and competency enhancement in the IT networking domain.

KU11. effective research methodologies, including the use of technical documentation, knowledge bases, vendor manuals, and online repositories for problem resolution and knowledge enhancement.

KU12. change management concepts, including adaptation to new technologies, systems upgrade, and evolving organisational processes.

KU13. team dynamics, roles, and responsibilities within IT projects and support teams.

KU14. professional ethics, workplace discipline, and organisational code of conduct in collaborative technical environments.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate clearly and professionally with colleagues, supervisors, and project stakeholders in oral and written forms.

GS2. organise and prioritise tasks effectively to meet deadlines in dynamic IT work environments.

GS3. apply logical thinking and analytical skills to identify issues and support timely resolution.

GS4. manage time efficiently while handling multiple responsibilities and changing priorities.

GS5. collaborate constructively within a team to achieve shared technical and project objectives.

GS6. adapt proactively to technological changes, new tools, and updated work procedures.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Work Safety and Management	**30**	**60**	**-**	**10**
PC1. Follow health and safety standards, rules, and regulations.	3	5	-	1
PC2. Maintain a safe working environment.	3	5	-	1
PC3. Identify and use the appropriate Personal Protective Equipment for ESD.	3	6	-	1
PC4. • Select, use, clean, maintain, and store tools and equipment safely and • securely.	2	6	-	1
PC5. Plan the work area to maximise efficiency and maintain the discipline of regular tidying.	3	5	-	1
PC6. Regularly schedule, reschedule, and multitask according to changing priorities.	3	6	-	-
PC7. Work efficiently and check progress and outcomes regularly.	1	5	-	1
PC8. Undergo various certification requirements, such as Cisco, Microsoft, and Linux, specialising in at least one specific area.	3	3	-	-
PC9. Use thorough and efficient research methods to support knowledge growth	3	6	-	1
PC10. Be enthusiastic to try new methods, systems, and embrace change	3	4	-	1
PC11. • Collaborate effectively with work colleagues to maximise efficiency and • learning.	2	5	-	1
PC12. Work effectively as a member of a project team.	1	4	-	1
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N6804
NOS Name	Maintain Work Organisation and Management
Sector	Telecom
Sub-Sector	
Occupation	Network Operation & Maintenance
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	06/02/2026
Next Review Date	06/02/2028
NSQC Clearance Date	06/02/2026

TEL/N6805: Communicate Effectively and Demonstrate Interpersonal Skills

Description

This NOS defines the communication and interpersonal competencies required in IT workplaces, such as active listening, clear communication, teamwork, knowledge sharing, and constructive conflict management to maintain effective professional relationships.

Scope

The scope covers the following :

- Apply effective communication practices
- Adapt communication to workplace needs
- Contribute to teamwork and knowledge sharing
- Manage interpersonal challenges professionally

Elements and Performance Criteria

To be competent, the user/individual on the job must be able to:

PC1. Use strong listening and questioning skills to deepen understanding of complex situations.

PC2. Maintain consistently effective verbal and written communications with colleagues.

PC3. Recognise and adapt to the changing needs of colleagues.

PC4. Proactively contribute to the development of a strong and effective team.

PC5. Share knowledge and expertise with colleagues and help develop a supportive learning culture.

PC6. Manage tension/anger and give confidence that problems can be resolved.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. principles and models of effective communication, including verbal, non-verbal, and written forms used in professional IT environments.

KU2. importance of active listening, empathy, and perception in interpreting complex technical and interpersonal situations.

KU3. questioning techniques (open, closed, probing, and clarifying questions) and their role in gathering accurate information.

KU4. organisational communication protocols, reporting structures, and formal and informal communication channels.

KU5. impact of tone, language, and cultural sensitivity in workplace interactions.

KU6. team dynamics, stages of team development, and factors that influence collaboration and performance.

KU7. knowledge-sharing practices, documentation standards, and collaborative learning mechanisms within technical teams.

KU8. basic concepts of emotional intelligence, including self-awareness, self-regulation, motivation, empathy, and social skills.

KU9. conflict management theories, stress triggers, and techniques for maintaining professionalism during disagreements.

KU10. importance of trust-building, mutual respect, and positive workplace behaviour in fostering a supportive and productive work culture.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate ideas, instructions, and feedback clearly and professionally in both verbal and written formats.

GS2. build positive working relationships through cooperation, empathy, and mutual respect.

GS3. manage interpersonal conflicts calmly and contribute to constructive problem resolution.

GS4. adapt communication style according to the needs and expectations of different colleagues and situations.

GS5. contribute to team effectiveness by sharing knowledge and supporting collaborative learning.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	30	**60**	**-**	**10**
PC1. Use strong listening and questioning skills to deepen understanding of complex situations.	5	10	-	1
PC2. Maintain consistently effective verbal and written communications with colleagues.	5	10	-	2
PC3. Recognise and adapt to the changing needs of colleagues.	5	10	-	2
PC4. Proactively contribute to the development of a strong and effective team.	5	10	-	2
PC5. Share knowledge and expertise with colleagues and help develop a supportive learning culture.	5	10	-	1
PC6. Manage tension/anger and give confidence that problems can be resolved.	5	10	-	2
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N6805
NOS Name	Communicate Effectively and Demonstrate Interpersonal Skills
Sector	Telecom
Sub-Sector	
Occupation	Network Operation & Maintenance
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	06/02/2026
Next Review Date	06/02/2028
NSQC Clearance Date	06/02/2026

TEL/N6806: Configure and Maintain Data Transfer Networks

Description

This NOS describes the competencies required to configure, maintain, and secure enterprise network infrastructure, including routing and switching configuration, network redundancy, VPN connectivity, and network monitoring and troubleshooting.

Scope

The scope covers the following :

- Initialise and configure network infrastructure
- Implement enterprise routing and network connectivity
- Ensure network availability and performance
- Implement network security and remote connectivity
- Monitor and analyse network performance

Elements and Performance Criteria

To be competent, the user/individual on the job must be able to:

PC1. Perform basic initialisation of active network equipment.

PC2. Configure access, aggregation and core-level switching

PC3. Provide enterprise-wide connectivity using internal and external gateway routing protocols such as OSPF, BGP and EIGRP

PC4. Provide network load balancing & fault tolerance at routing and switching levels by using GLBP, HSRP, VRRP, LACP, PAgP, etc.

PC5. Apply basic security configuration for control and data plane.

PC6. Provide network connectivity between remote branches using VPN technologies such as IPSec, SSL VPN, Direct Access, OpenVPN, DMVPN, GRE, etc.

PC7. Use network discovery and traffic analysis tools such as CDP, NetFlow, Syslog, SNMP and tcpdump.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. fundamental concepts of data communication, OSI and TCP/IP models, and the role of active network devices such as routers and switches in enterprise networks.

KU2. architecture and functional differences between access, aggregation (distribution), and core layers in hierarchical network design.

KU3. principles of VLANs, trunking, inter-VLAN routing, and Layer 2 and Layer 3 switching operations.

KU4. the concepts of dynamic routing protocols and their operational characteristics, including OSPF, BGP, and EIGRP.

KU5. routing metrics, path selection algorithms, convergence behaviour, and route redistribution concepts in enterprise networks.

KU6. high availability and redundancy mechanisms, including first-hop redundancy protocols such as HSRP, VRRP, and GLBP, as well as link aggregation concepts.

KU7. load balancing techniques and fault tolerance strategies at Layer 2 and Layer 3 to ensure business continuity.

KU8. control plane and data plane security concepts, including access control lists (ACLs), port security, authentication mechanisms, and basic network hardening practices.

KU9. wide area network (WAN) technologies and secure tunnelling concepts, including IPsec, SSL VPN, GRE, DMVPN, and OpenVPN.

KU10. principles of network address translation (NAT), IP addressing (IPv4/IPv6), and subnetting in enterprise environments.

KU11. purpose and working of network monitoring, logging, and discovery protocols such as SNMP, NetFlow, Syslog, CDP, and packet analysis tools like tcpdump.

KU12. organisational standards, documentation practices, and change management procedures related to network configuration and maintenance.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	30	**60**	**-**	**10**
PC1. Perform basic initialisation of active network equipment.	5	8	-	1
PC2. Configure access, aggregation and core-level switching	4	8	-	2
PC3. Provide enterprise-wide connectivity using internal and external gateway routing protocols such as OSPF, BGP and EIGRP	4	8	-	2
PC4. Provide network load balancing & fault tolerance at routing and switching levels by using GLBP, HSRP, VRRP, LACP, PAgP, etc.	4	10	-	1
PC5. Apply basic security configuration for control and data plane.	4	8	-	2
PC6. Provide network connectivity between remote branches using VPN technologies such as IPSec, SSL VPN, Direct Access, OpenVPN, DMVPN, GRE, etc.	4	10	-	1
PC7. Use network discovery and traffic analysis tools such as CDP, NetFlow, Syslog, SNMP and tcpdump.	5	8	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N6806
NOS Name	Configure and Maintain Data Transfer Networks
Sector	Telecom
Sub-Sector	
Occupation	Network Operation & Maintenance
NSQF Level	4
Credits	3
Version	1.0
Last Reviewed Date	06/02/2026
Next Review Date	06/02/2028
NSQC Clearance Date	06/02/2026

TEL/N6807: Perform Network and System Operations

Description

This NOS covers the installation, configuration, and management of enterprise network and system services, including directory services, DNS, DHCP, monitoring, web hosting, backup systems, and storage management within Windows and Linux environments.

Scope

The scope covers the following :

- Deploy and manage core network services
- Manage secure remote access and authentication services
- Implement infrastructure monitoring and communication services
- Manage application hosting and resource sharing services
- Manage system backup, deployment, and storage

Elements and Performance Criteria

To be competent, the user/individual on the job must be able to:

PC1. Install and manage enterprise directory services (ADDS, LDAP)

PC2. Install and manage domain name services (Windows DNS, BIND)

PC3. Install and manage dynamic host configuration services.

PC4. Install and manage network address translation services.

PC5. Install and manage network time services.

PC6. Install and manage remote network access services (SSH, Remote Desktop Services)

PC7. Install and manage authentication, authorisation and accounting services.

PC8. Install and manage IT infrastructure resources monitoring systems (Icinga2, Nagios, Cacti, Windows Resource Monitor)

PC9. Install and manage e-mail exchange systems using SMTP, IMAP and POP with or without encryption.

PC10. Set up public key infrastructure services (Active Directory Certificate Services & OpenSSL)

PC11. Install and manage sharing services (SMB, DFS, NFS & FTP)

PC12. Install and manage web hosting services using modern web servers, e.g. Apache, Nginx and IIS.

PC13. Install and manage terminal access services (SSH, Remote Desktop Services & Telnet)

PC14. Install and manage back-up systems using Windows Server Back-up, rsync and script-based back-up, such as Bash, Batch or PowerShell.

PC15. Install and manage client workstations deployment systems using Windows Deployment Services and Group Policy.

PC16. Manage file systems using Software RAID, mdadm, LVM/Dynamic disks or File systems such as NTFS, ReFS, EXT4 and NTFS.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. architecture, components, and functioning of enterprise directory services such as Active Directory Domain Services and LDAP in identity and resource management.

KU2. domain name system concepts, hierarchical namespace design, zone files, and resolution processes in services such as BIND and Windows DNS.

KU3. principles of IP address allocation, lease management, and scope configuration in Dynamic Host Configuration Protocol (DHCP) services.

KU4. network address translation (NAT) concepts, including static NAT, dynamic NAT, and PAT, and their role in address conservation and security.

KU5. importance of time synchronisation in distributed systems and the functioning of Network Time Protocol (NTP) services.

KU6. secure remote access mechanisms and encryption principles used in SSH and Remote Desktop Services environments.

KU7. authentication, authorisation, and accounting (AAA) frameworks, including role-based access control and policy enforcement models.

KU8. system and network monitoring concepts, alerting mechanisms, performance baselining, and log management using tools such as Nagios, Icinga, and Cacti.

KU9. e-mail system architecture, mail transfer and retrieval protocols including SMTP, IMAP, and POP3, and the role of encryption in secure mail communication.

KU10. public key infrastructure (PKI) concepts, digital certificates, certificate authorities, and cryptographic key management using OpenSSL and Active Directory Certificate Services.

KU11. file and resource sharing protocols such as SMB, NFS, FTP, and distributed file system concepts.

KU12. web server architecture, HTTP/HTTPS protocols, and hosting environments using Apache HTTP Server, Nginx, and Microsoft IIS.

KU13. terminal access technologies, legacy and secure remote login protocols, and associated security implications including Telnet.

KU14. backup strategies, recovery objectives (RPO/RTO), scheduling, and automation concepts using tools such as rsync and Windows Server Backup.

KU15. client deployment methodologies, imaging concepts, unattended installations, and policy-based configuration management using Windows Deployment Services and Group Policy.

KU16. file system structures and characteristics, including NTFS, ReFS, and ext4.

KU17. storage management concepts including Software RAID, logical volume management (LVM), and dynamic disks for performance and redundancy.

KU18. operating system fundamentals for Windows and Linux server environments in enterprise deployments.

KU19. security hardening principles, patch management, and vulnerability mitigation in network and system operations.

KU20. documentation standards, change management processes, and configuration management practices in IT operations.

KU21. compliance requirements, data protection principles, and organisational policies related to system availability, integrity, and confidentiality.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. prioritise operational tasks to ensure high availability and minimal service disruption.

GS2. document configurations, incidents, and recovery procedures accurately for audit and knowledge sharing.

GS3. communicate technical information clearly to team members and stakeholders.

GS4. apply security-conscious decision-making while managing network and system services.

GS5. coordinate effectively with cross-functional teams during deployments, upgrades, and maintenance.

GS6. continuously upgrade technical competencies in line with evolving enterprise technologies.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	30	60	-	10
PC1. Install and manage enterprise directory services (ADDS, LDAP)	2	4	-	1
PC2. Install and manage domain name services (Windows DNS, BIND)	1	4	-	1
PC3. Install and manage dynamic host configuration services.	2	4	-	1
PC4. Install and manage network address translation services.	2	4	-	-
PC5. Install and manage network time services.	1	3	-	-
PC6. Install and manage remote network access services (SSH, Remote Desktop Services)	2	4	-	1
PC7. Install and manage authentication, authorisation and accounting services.	2	4	-	1
PC8. Install and manage IT infrastructure resources monitoring systems (Icinga2, Nagios, Cacti, Windows Resource Monitor)	2	4	-	-
PC9. Install and manage e-mail exchange systems using SMTP, IMAP and POP with or without encryption.	2	4	-	1
PC10. Set up public key infrastructure services (Active Directory Certificate Services & OpenSSL)	2	4	-	-
PC11. Install and manage sharing services (SMB, DFS, NFS & FTP)	2	4	-	1
PC12. Install and manage web hosting services using modern web servers, e.g. Apache, Nginx and IIS.	2	4	-	1
PC13. Install and manage terminal access services (SSH, Remote Desktop Services & Telnet)	2	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. Install and manage back-up systems using Windows Server Back-up, rsync and script-based back-up, such as Bash, Batch or PowerShell.	2	4	-	-
PC15. Install and manage client workstations deployment systems using Windows Deployment Services and Group Policy.	2	3	-	1
PC16. Manage file systems using Software RAID, mdadm, LVM/Dynamic disks or File systems such as NTFS, ReFS, EXT4 and NTFS.	2	3	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N6807
NOS Name	Perform Network and System Operations
Sector	Telecom
Sub-Sector	
Occupation	Network Operation & Maintenance
NSQF Level	4
Credits	3
Version	1.0
Last Reviewed Date	06/02/2026
Next Review Date	06/02/2028
NSQC Clearance Date	06/02/2026

TEL/N6808: Implement Infrastructure Automation and Configuration Management

Description

This NOS focuses on automating infrastructure management tasks using scripting and configuration management tools, including developing automation scripts, managing version-controlled configurations, and implementing infrastructure as code practices.

Scope

The scope covers the following :

- Develop and run infrastructure automation scripts
- Manage configuration and version control
- Implement infrastructure as code practices
- Maintain secure and compliant automation environments

Elements and Performance Criteria

To be competent, the user/individual on the job must be able to:

PC1. Set up and run routine infrastructure maintenance operations using various scripting \ programming languages like Bash and PowerShell.

PC2. Use modern automation tools for systems deployment and configuration management, e.g., Git.

PC3. Identify and implement infrastructure as code using Ansible.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. fundamentals of scripting and automation concepts, including variables, control structures, functions, and error handling in languages such as Bash and PowerShell.

KU2. operating system administration concepts in Linux and Windows environments relevant to task automation and maintenance operations.

KU3. principles of configuration management, version control, and change tracking in infrastructure environments using tools such as Git.

KU4. concepts of Infrastructure as Code (IaC), including declarative and imperative approaches to system provisioning and configuration.

KU5. architecture and working principles of automation tools such as Ansible, including playbooks, inventories, modules, and agentless management.

KU6. security best practices in automation, including credential management, access control, secure repositories, and audit trails.

KU7. organisational policies for documentation, testing, rollback procedures, and compliance in automated deployment and configuration management processes.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. analyse repetitive operational tasks and identify opportunities for automation.
GS2. apply logical and structured thinking while developing and reviewing scripts.
GS3. manage time effectively by scheduling and monitoring automated jobs.
GS4. document automation workflows and configuration changes clearly.
GS5. collaborate with team members using shared repositories and version control practices.
GS6. adapt to evolving automation tools and continuously upgrade scripting and DevOps competencies.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	30	**60**	**-**	**10**
PC1. Set up and run routine infrastructure maintenance operations using various scripting \ programming languages like Bash and PowerShell.	15	30	-	3
PC2. Use modern automation tools for systems deployment and configuration management, e.g., Git.	10	20	-	4
PC3. Identify and implement infrastructure as code using Ansible.	5	10	-	3
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N6808
NOS Name	Implement Infrastructure Automation and Configuration Management
Sector	Telecom
Sub-Sector	
Occupation	Network Operation & Maintenance
NSQF Level	4
Credits	3
Version	1.0
Last Reviewed Date	06/02/2026
Next Review Date	06/02/2028
NSQC Clearance Date	06/02/2026

TEL/N6809: Troubleshoot IT Systems, Networks, and Services

Description

This NOS describes the competencies required to diagnose and resolve IT infrastructure issues across systems, networks, and services.

Scope

The scope covers the following :

- Identify user requirements and system needs
- Design and document technical solutions
- Implement and configure system solutions
- Test and validate implemented solutions
- Diagnose and troubleshoot system and network issues

Elements and Performance Criteria

To be competent, the user/individual on the job must be able to:

PC1. Closely listen, translate, and accurately identify user needs to ensure expectations are met.

PC2. Select the operating system: proprietary/open source, total cost of ownership in relation to customer resources.

PC3. Accurately identify the hardware and appropriate software driver required to match user/manufacturer specifications.

PC4. Consistently check manufacturers' guidance for upgrading regarding “workflow”.

PC5. Select the roles and/or features of the operating/server system, e.g. Active Directory Domain Services (role) and Window Server Back-up (feature).

PC6. Discuss the proposed solution(s) for role/feature and agree with relevant parties like users, colleagues, and managers.

PC7. Prepare a technical document reflecting the solution in detail for agreement and sign-off.

PC8. Configure the appropriate role/feature following the manufacturer's instructions or best practice within the organisation.

PC9. Test and rectify any problems and re-test as appropriate

PC10. Gain user acceptance and record.

PC11. Use system logs to find and identify issues.

PC12. Use network package inspection and connectivity checking tools to troubleshoot and identify problems in a network.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. principles of effective requirement gathering, user expectation management, and service-oriented communication in IT support environments.

KU2. characteristics, licensing models, and total cost of ownership considerations of proprietary and open-source operating systems.

KU3. hardware architecture concepts, device compatibility standards, and the role of firmware and software drivers in system functionality.

KU4. importance of vendor documentation, release notes, upgrade paths, and workflow dependencies in system implementation and maintenance.

KU5. server operating system architecture and the concept of roles and features, including services such as Active Directory Domain Services and Windows Server Backup.

KU6. solution design principles, including feasibility analysis, risk assessment, and alignment with organisational policies and infrastructure standards.

KU7. documentation standards, technical writing structure, and change management processes for approvals and sign-off.

KU8. configuration management principles and adherence to manufacturer best practices and organisational security guidelines.

KU9. software and hardware testing methodologies, including functional testing, regression testing, and validation techniques.

KU10. user acceptance testing (UAT) principles and service validation processes.

KU11. the structure and interpretation of system and application logs in Windows and Linux environments.

KU12. event logging mechanisms and monitoring frameworks used for fault detection and root cause analysis.

KU13. network troubleshooting methodologies based on OSI and TCP/IP models.

KU14. packet inspection, traffic analysis, and connectivity verification concepts using tools such as Wireshark and common command-line utilities.

KU15. escalation procedures, incident management lifecycle, and service level agreement (SLA) considerations.

KU16. data integrity, backup verification, and rollback concepts during troubleshooting and system modifications.

KU17. organisational security policies, compliance requirements, and confidentiality considerations during system and network troubleshooting.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. apply analytical and logical reasoning to diagnose system and network issues systematically.

GS2. communicate technical information clearly to users, colleagues, and management at appropriate levels of detail.

GS3. evaluate alternative solutions and make informed decisions considering cost, risk, and performance impact.

GS4. document incidents, solutions, and configuration changes accurately and professionally.

GS5. manage time effectively while handling multiple incidents and prioritising critical issues.

GS6. collaborate with cross-functional teams to resolve complex technical problems.

GS7. remain calm and professional under pressure while addressing user concerns and service disruptions.

GS8. continuously update technical knowledge to adapt to evolving operating systems, tools, and troubleshooting methodologies.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	30	**60**	**-**	**10**
PC1. Closely listen, translate, and accurately identify user needs to ensure expectations are met.	2	4	-	-
PC2. Select the operating system: proprietary/open source, total cost of ownership in relation to customer resources.	3	6	-	1
PC3. Accurately identify the hardware and appropriate software driver required to match user/manufacturer specifications.	2	4	-	1
PC4. Consistently check manufacturers' guidance for upgrading regarding “workflow”.	3	6	-	1
PC5. Select the roles and/or features of the operating/server system, e.g. Active Directory Domain Services (role) and Window Server Back-up (feature).	2	4	-	1
PC6. Discuss the proposed solution(s) for role/feature and agree with relevant parties like users, colleagues, and managers.	2	4	-	1
PC7. Prepare a technical document reflecting the solution in detail for agreement and sign-off.	3	6	-	1
PC8. Configure the appropriate role/feature following the manufacturer's instructions or best practice within the organisation.	2	4	-	1
PC9. Test and rectify any problems and re-test as appropriate	3	6	-	-
PC10. Gain user acceptance and record.	3	6	-	1
PC11. Use system logs to find and identify issues.	3	6	-	1
PC12. Use network package inspection and connectivity checking tools to troubleshoot and identify problems in a network.	2	4	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N6809
NOS Name	Troubleshoot IT Systems, Networks, and Services
Sector	Telecom
Sub-Sector	
Occupation	Network Operation & Maintenance
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	06/02/2026
Next Review Date	06/02/2028
NSQC Clearance Date	06/02/2026

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council.

2. Element/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 Element/PC.

3. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

4. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

5. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

6. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

7. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.

8. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
TEL/N6804.Maintain Work Organisation and Management	30	60	-	10	100	17
TEL/N6805.Communicate Effectively and Demonstrate Interpersonal Skills	30	60	-	10	100	16
TEL/N6806.Configure and Maintain Data Transfer Networks	30	60	-	10	100	17
TEL/N6807.Perform Network and System Operations	30	60	-	10	100	17
TEL/N6808.Implement Infrastructure Automation and Configuration Management	30	60	-	10	100	17
TEL/N6809.Troubleshoot IT Systems, Networks, and Services	30	60	-	10	100	16
Total	**180**	**360**	**-**	**60**	**600**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.