



**Technical and Vocational Education and Training (TVET) Council**



**Occupational Standards  
of Competence**

**Network Administration**

**Level 3**

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Published by:  
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## **ACKNOWLEDGEMENTS**

The Technical and Vocational Education and Training Council thanks the following for their contribution to the development of this document.

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**Qualification Overview**

**NVQB**

**in**

**Network Administration**

**Level 3**

### Qualification Overview

This qualification is designed to provide guidance, training, assessment and certification in Network Administration. It is aimed at training providers, employers and all persons involved in network administration in the information technology industry. It deals with implementing, managing and troubleshooting an organisation's network. It also includes competencies in occupational health and safety for network administration, leading a team and planning and allocating work to a team. The standard also includes competencies for contributing to the protection of the environment and crafting personal entrepreneurial strategy.

### Who is this qualification for?

The qualification is designed for persons who work in the areas of network administration, computer science, computer programming, computer engineering and the information technology sector.

### Jobs in the occupational sector:

- Network administrator
- Network manager

This list is not exhaustive and only serves to illustrate the breadth of the qualification.

## **A010803 - APPROVED NATIONAL VOCATIONAL QUALIFICATION STRUCTURE**

### **NETWORK ADMINISTRATION LEVEL 3**

To achieve the full qualification, candidates must complete **all** sixteen (16) mandatory units.

#### **MANDATORY UNITS (ALL MUST BE COMPLETED)**

#### **CODES**

- |   |                |
|---|----------------|
| <b>1. Outline the network process, security design and response</b>               | <b>UA44602</b> |
| 1.1 Plan the security design process  |                |
| 1.2 Identify threats to network security  |                |
| 1.3 Analyse security risks  |                |
| 1.4 Create a security design  |                |
| 1.5 Design the security incidents response  |                |
| <b>2. Implement network security for an organisation</b>                          | <b>UA44702</b> |
| 2.1 Prepare to design and implement a network security infrastructure             |                |
| 2.2 Design a network security infrastructure                                      |                |
| 2.3 <b>Implement</b> a network security infrastructure                            |                |
| 2.4 Finalise and monitor a network security infrastructure                        |                |
| <b>3. Configure network devices for a secure network infrastructure</b>           | <b>UA44803</b> |
| 3.1 Implement layer two security  |                |
| 3.2 Establish router OS intrusion prevention system (OS-IPS)                      |                |
| 3.3 Set up virtual private networks (VPNs)  |                |
| 3.4 Provide secure connectivity for site-to-site and remote access communications |                |
| <b>4. Configure and administer network and operating systems</b>                  | <b>UA44903</b> |
| 4.1 Identify and assess network features  |                |
| 4.2 Administer and support systems  |                |
| 4.3 Set up and manage operating system file structures                            |                |
| 4.4 Administer local and remote user services and accounts sessions               |                |
| 4.5 Provide backup security support   |                |
| <b>5. Plan the deployment of an on-premises or customer owned network</b>         | <b>UA45003</b> |
| 5.1 Scope the project   |                |
| 5.2 Develop a deployment plan for an on-premises or customer owned network        |                |
| 5.3 Complete work and report the impact on network performance                    |                |

## **MANDATORY UNITS (ALL MUST BE COMPLETED)**

## **CODES**

### **6. Identify and resolve network problems**

**UA45103**

- 6.1 Implement network monitoring
- 6.2 Prepare to troubleshoot network problems
- 6.3 Diagnose network faults
- 6.4 Rectify faults
- 6.5 Finalise the fault rectification process

### **7. Configure computing services**

**UA45203**

- 7.1 Select and secure access to the cloud environment
- 7.2 Deploy a virtual network
- 7.3 Set up automatic scaling
- 7.4 Finalise a virtual network infrastructure

### **8. Support small ICT projects**

**UA45303**

- 8.1 Commence project
- 8.2 Develop project plan
- 8.3 Complete project
- 8.4 Close project

### **9. Design and configure LAN and WAN networks**

**UA45403**

- 9.1 Document current network configuration
- 9.2 Research client needs
- 9.3 Implement a site survey
- 9.4 Provide secure connectivity for remote access
- 9.5 Model and simulate networks
- 9.6 Determine components for networks
- 9.7 Identify WAN needs
- 9.8 Create WAN specifications

### **10. Provide ICT support and training to clients**

**UA45503**

- 10.1 Manage customer support requirements
- 10.2 Provide advice on software, hardware or network
- 10.3 Obtain client feedback

### **11. Prepare disaster recovery contingency plans**

**UA45603**

- 11.1 Evaluate the impact of systems on business continuity
- 11.2 Monitor threats to systems
- 11.3 Formulate a prevention and recovery strategy

**MANDATORY UNITS (ALL MUST BE COMPLETED)****CODES****12. Plan and assign work****UA45703**

- 12.1 Plan work for team members
- 12.2 Allocate work
- 12.3 Improve team performance

**13. Lead your team****U83504**

- 13.1 Plan work
- 13.2 Support team members

**14. Maintain safe and effective working practices****U92502**

- 14.1 Maintain the safety of self and others in the workplace
- 14.2 Maintain working relationships with others
- 14.3 Maintain and develop personal performance

**15. Develop an entrepreneurial strategy****UA45803**

- 15.1 Identify the nature of entrepreneurship
- 15.2 Identify and assess entrepreneurial characteristics
- 15.3 Develop a self-assessment profile
- 15.4 Craft an entrepreneurial strategy

**16. Contribute to the protection of the environment****U68402**

- 10.1 Work in an environmentally conscious way
- 10.2 Contribute to continuous improvements in protecting the environment



**UA44603****Outline the network process, security design and response**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to implement and manage security functions throughout a network. It includes planning the security design process, identifying threats to network security, analysing security risks, creating a security design and designing the security incidents response.

ELEMENT	PERFORMANCE CRITERIA
<i>Candidates must be able to:</i>	
1. Plan the security design process	1.1 <b>Define</b> the planning phase for the network security design according to industry and organisational requirements.  1.2 <b>Define</b> the building phase for the network security design according to specifications, industry requirements and organisational  1.3 <b>Define</b> the managing phase for the network security design according to industry and organisational requirements.
2. Identify threats to network security	2.1 <b>Determine</b> major threat themes to network security in accordance with organisational requirements.  2.2 <b>Determine</b> the potential origin of major threats according to network security design specifications.  2.3 <b>Identify</b> and document industry standard common network vulnerability types according to organisational requirements.  2.4 Design and document the threat model according to network security design specifications.
3. Analyse security risks	3.1 <b>Determine</b> the required elements of risk management according to network security design specifications.

- 3.2 Research and identify organisational assets requiring protection according to organisational policies and procedures.
  - 3.3 **Determine** and document assets and determine their value according to industry requirements.
  - 3.4 **Determine** and document the risk management plan according to industry and organisational requirements.
- 4. Create a security design
  - 4.1 **Determine** attacker scenarios and threats according to network security design specifications.
  - 4.2 Design and document network component security measures according to industry requirements and organisational policy and procedures.
  - 4.3 Develop and document security policies according to organisational policies and procedures.
  - 4.4 Present documents to required personnel and seek and respond to feedback.
- 5. Design the security incidents response
  - 5.1 **Design** and document the auditing and incidents response procedure according to network security design specifications.
  - 5.2 Present the auditing and incidents response procedure to required personnel, seek and respond to feedback.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Network security design** may include but not limited to:

- Cost, budget
- Network Access Control (NAC), firewalls
- Intrusion Prevention Systems (IPS)
- Security of Information/Event Management (SIEM)
- Virtual Private Network (VPN) tool manager
- Wireless protection

**3. Assets** may include but not limited to:

- Network equipment
- Network servers
- Workstations
- Data files

**2. Threat** may include but not limited to:

- Malware/spyware/adware
- Password attacks
- Computer worms
- Trojans
- Botnets,
- Distributed denial of service attacks (ddos),
- Man in the Middle (MITM)
- Social engineering (phishing,
- Spear phishing baiting,
- Tail gaiting,
- Pretexting,
- Quid pro quo,
- Advanced persistent threats (APT)

**4. Required personnel** may include but not limited to:

- Owner/management
- Supervisor

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What is the process involved in planning, building and managing the phases for network security design according to industry requirements.
2. What are the major threats to network security and their potential origin.
3. Why it is important to identify major threats and how to do so.
4. How to design and document threat models.
5. How to identify the source of major threats according to network security specifications.
6. What are the common industry standard types of vulnerabilities.
7. How to design and document threat models.
8. What are the required elements of risk management according to network security design specifications.
9. How to identify, document and determine the value of assets according to industry requirements.
10. What are the steps involved in creating a risk management plan.
11. What is the process for testing the deployment of a network security infrastructure.
12. What are the steps for reviewing test results and logs and what determines if they should be amended.
13. Why it is important to inform relevant persons on the completion of requirements and how to do so.
14. Why it is important for work performed to be recorded according to organisational policies.
15. How routine reviews of network security infrastructure are processed.
16. What are the steps involved in designing the audit and incidents response procedures.
17. How to seek and respond to feedback on audit and incidents response procedures.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur

**UA44703****Implement network security for an organisation**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to set up a network security infrastructure scalable for a medium to large organisation. Candidates will be required to complete the process through preparation, design and implementation to monitoring the network security infrastructure

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |  |   |
|--|---|
| 1. Prepare to design and implement a network security infrastructure | 1.1 Obtain work details and scope from required personnel and arrange for site access in compliance with required security arrangements, legislation, codes, regulations and industry standards.<br><br>1.2 Establish security threats impacting the organisation with required personnel and assess their likelihood.<br><br>1.3 Confirm and document established requirements and risks according to organisational procedures. |
| 2. Design a network security infrastructure                          | 2.1 Establish suitable requirements and features of a network security infrastructure according to organisational requirements.<br><br>2.2 Identify and evaluate a range of industry standard network security providers according to organisational requirements<br><br>2.3 Select and confirm network security providers with required personnel according to infrastructure requirements.                                      |
| 3. Implement a network security infrastructure                       | 3.1 Establish and create secure network boundaries according to the organisation's specific site architecture.<br><br>3.2 Implement server, application and user security technologies according to network security requirements.  |

- |   |     |   |
|---|-----|---|
|   | 3.3 | Confirm the required levels of user access throughout the organisation.   |
|   | 3.4 | Establish maintenance and alert processes for risk and security threats according to organisational procedures.               |
| 4. Finalise and monitor a network security infrastructure | 4.1 | Test the deployment of the network security infrastructure and its components according to organisational testing procedures. |
|   | 4.2 | Collect and review test results and logs and adjust as necessary according to organisational requirements.                    |
|   | 4.3 | Confirm with required personnel that requirements have been met.  |
|   | 4.4 | Record and document work performed and results according to organisational procedures.  |
|   | 4.5 | Complete routine reviews of network security infrastructure according to organisational procedures.                           |

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Legislation, codes, regulations** may include but not limited:

- Data protection, identity theft
- ICT policies, codes, regulations and networking industry standards

**2. Security threats** may include but not limited:

- Unstructured
- Structured
- Internal
- External

**3. Network security infrastructure** may include but not limited:

- Connectivity
- Routing and switching capabilities
- Network security requirements
- Access control
- Organisational business processes and applicable organisational infrastructure



**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What are the relevant legal regulations and codes in relation to designing and implementing a network security infrastructure.
2. What are the different types of security threats and the likelihood of occurrence.
3. What are the steps involved in documenting established requirements and risks.
4. What are the features of a network infrastructure.
5. What are the organisational procedures applicable to designing and implementing a network security infrastructure.
6. What are the requirements for selecting network security personnel and with whom they should be confirmed.
7. How are network security boundaries established.
8. How are server, application and user security technologies implemented.
9. What are the required elements of risk management according to network security design specifications.
10. Why it is important to confirm levels of user access and how to do so.
11. What is the process for testing the deployment of network security infrastructure.
12. What are the steps for reviewing test results and logs and what determines if they should be amended.
13. Why it is important to inform relevant persons on the completion of requirements and how to do so.
14. Why it is important for work performed to be recorded according to organisational policies.
15. How routine reviews of network security infrastructure are processed.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur

**UA44803****Configure network devices for a secure network infrastructure**

Unit Descriptor:

This unit describes the knowledge, skills and attitudes required to use software tools, equipment, and protocols to configure network devices in the design of the infrastructure of a secure network.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |   |  |
|---|--|
| 1. Implement layer two security                                       | 1.1 Install and configure security devices operating system (OS) commands and mitigate layer two attacks.<br><br>1.2 Implement identity management using access control system (ACS) as the authentication server.   |
| 2. Establish security devices OS intrusion prevention system (OS-IPS) | 2.1 Evaluate the advanced capabilities of security devices OS-IPS firewall feature set and include event action processing (EAP).<br><br>2.2 Create and verify IPS features, identify threats and dynamically block from network.<br><br>2.3 Maintain, update and tune required IPS signatures consistently according to organisational requirements.<br><br>2.4 Create and verify context-based access control (CBAC) and network address translation (NAT) and dynamically mitigate identified network threats in accordance with established procedures.<br><br>2.5 Create and verify security devices, advanced application inspections and uniform resource locator (URL) filtering in accordance with organisational requirements. |
| 3. Set-up virtual private networks (VPNs)                             | 3.1 Analyse and evaluate VPN requirements according to the needs of the organisation.<br><br>3.2 Configure secure connectivity for site-to-site VPN according to the needs of the organisation.  |

- 4. Provide secure connectivity for site-to-site and remote access communications
  - 4.1 Provide highly secure network access with VPN to deliver remote access connectivity features and benefits.
  - 4.2 Implement VPN security features for the provisioning and management of VPN.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Threats** may include but not limited to:

- Denial of service (DOS)
- Spoofing
- Media access control (MAC)
- Port scanning
- Sniffing

**2. Remote access connectivity features and benefits** may include but not limited to:

- Flexible and cost- effective licensing
- Lower desktop support costs
- Reduced cost and management complexity
- Threat protection

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What is the process for evaluating network security system requirements.
2. How are security device operating system (OS) commands configured to mitigate layer 2 attacks.
3. How are network security systems designed, implemented and verified using 2 layer devices.
4. How are security devices set up and secured on a network.
5. How are threats identified and blocked on a network.
6. Why is it important to tune IPS/IDS devices and to develop policies and procedures to continuously update signatures for a secure network infrastructure and how to do so.
7. What are the procedures for configuring, verifying and troubleshooting security device operations and routing on VPNs.
8. What is the process for providing secure connectivity and remote access on a network infrastructure.
9. What is the process for implementing local area networks (LAN) and wide area networks (WAN).
10. How can a dynamic virtual tunnel interface be used to configure VPN server for site-to-site and remote access communications.
11. How to implement VPN security features for the provisioning and management of a VPN.

## EVIDENCE GUIDE

*For assessment purposes:*

### **(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

### **(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

### **(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA44903****Configure and administer network and operating systems**

Unit Descriptor:

This unit describes the knowledge, skills and attitudes required to use software tools, equipment, and protocols to configure network devices in the design of the infrastructure of a secure network.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
<i>Candidates must be able to:</i>	
1. Identify and assess network features	1.1 Determine the organisational policies and procedures used to administer network operating systems.  1.2 Determine the protocols used by the organisation's existing network.  1.3 Identify and appropriately rectify potential network integration compatibility issues and risks according to organisational requirements.
2. Administer and support systems	2.1 Plan the required upgrades and reconfigurations to the network operating system according to organisational requirements.  2.2 Determine organisational data requirements for the network operating system according to the organisational requirements.  2.3 Implement planned upgrades and reconfigurations according to task requirements.
3. Set up and manage operating system file structures	3.1 Create file and folder structures according to organisational requirements, policies and procedures.  3.2 Create security access and sharing of file systems to meet organisational requirements.
4. Administer local and remote user services and accounts sessions	4.1 Create users and groups required to facilitate user security and network access according to user authorisation and organisational requirements.



- 4.2 Verify successful user access to authorised network data and resources.
    - 4.3 Configure and verify VPN remote access connection for users for using both router and VPN software.
- 5.
  - Provide backup security support
    - 5.1 Scan and clean the network of viruses according to organisational policies
    - 5.2 Perform a backup of the network according to organisational procedures and requirements.
    - 5.3 Record and document processes used and lodge with required personnel according to organisational requirements.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Protocols** may include but not limited to:

- Standard Ethernet Version (en)
- IEEE 802.3 (et) series
- Serial Line Internet Protocol (SLIP)
- Loopback (LO)
- FDD
- Serial Optical (SO)
- Point-to-Point Protocol (PPP)
- Virtual IP Address (VI)

**2. Network integration compatibility issues and risks** may include but not limited to:

- Compatible hardware/software
- Operating systems
- Network
- Browser
- Devices
- Mobile
- Software versions

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What are the organisational policies and procedures relating to the administration of network operating systems.
2. Why it is necessary to identify the interfaces used by the organisation's existing network when configuring, administering, identifying and assessing network features and how to do so.
3. What are the network integration compatibility issues and risks that can be encountered when identifying and assessing network features.
4. How are upgrades and reconfigurations to network operating systems determined and implemented.
5. How are data requirements and data access frequency on systems performance remote interaction maps determined for network support systems.
6. What is the importance of installing anti-virus software and what are the procedures for the operation and updating of this software in a network operating system.
7. What is the process for the implementation of network security in a local area network (LAN) including file and folder permissions and users and user group settings.
8. How are users and groups created to facilitate user security and network access.
9. What is VPN and what are its components.
10. How VPN is used with routers and VPN software clients to establish a remote connection.
11. How are local area networks (LAN) and wide area networks (WAN) implemented on a network operating system.
12. What are the benefits of using virtual tunnel interface to configure VPN server for remote and remote access communications.
13. Why it is important to back up a network, how often should it be scanned and cleaned for viruses and how to do so.
14. Why the processes used during backup security support on a network should be recorded.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA45003****Plan the deployment of an on-premises or customer owned network**

## Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to plan the deployment of an on-premises or customer owned network including use and consideration of on-premises or customer owned network deployment data, technology, equipment, capacity management and network management information sources. On-premises or customer owned networks use convergent internet protocol (IP) based technologies with conventional technologies and network management information sources.

ELEMENT	PERFORMANCE CRITERIA
<i>Candidates must be able to:</i>	
1. Scope the project	<p>1.1 Prepare for work according to site-specific safety requirements and enterprise work health and safety (WHS) processes and procedures.</p> <p>1.2 Determine the appropriate type of an on-premises or customer-owned network by accessing and using network information sources.</p> <p>1.3 Produce a concise brief showing how an on-premises or customer-owned network architecture components relate to the larger network and their impact on the work.</p> <p>1.4 Evaluate equipment types and technologies to be considered to determine availability and compatibility with existing network equipment.</p> <p>1.5 Obtain appropriate resources and equipment required for the work according to enterprise procedures and check for correct operation and safety.</p> <p>1.6 Assess the capacity limitation of platforms in the context of the work to ensure maximum network performance.</p>

2. Develop a plan for an on-premises or customer owned network
  - 2.1 Assess the demand for an on-premises or customer-owned network using key geographic, demographic, forecast and bandwidth data.
  - 2.2 Identify the appropriate key parameters of the on-premises or customer-owned network to be measured for capacity management according to organisational requirements.
  - 2.3 Produce a suitable preliminary deployment plan for the on-premises or customer-owned network using architectural principles and assess the demand to maintain the integrity of an on-premises or customer owned network.
  - 2.4 Assess additional planning requirements for voice over internet protocol (VoIP) wireless voice networks from voice networks and for hosting and content distribution networks from media and content networks.
  - 2.5 Create an accurate financial business case for deployment of the on-premises or customer-owned network based on assessed demand to justify a return on investment (RoI) and operational costs.
  - 2.6 Discuss unexpected situations with appropriate personnel with consideration to job specifications, safety and enterprise procedures to establish a solution .
3. Complete work and report the impact on network performance
  - 3.1 Produce a final deployment plan including achievable recommendations agreed with customer.
  - 3.2 Provide a concise report on network monitoring techniques used to manage the network to ensure the network is performing at optimum level.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Equipment types** may include but not limited to:

- Network interface cards
- Personal computers
- Servers
- Workstations
- Network devices

**2. Operational costs** may include but not limited to:

- Direct/indirect
- Fixed
- Variable

**3. Customer** may include but not limited to:

- External organisations
- Individuals
- Internal departments
- Employees

**4. Network monitoring technologies** may include but not limited to:

- Log
- Simple network management protocol
- Net flow
- SQL query

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What preliminary work must be conducted when setting up an on-premises or customer-owned network.
2. What are the work health and safety procedures that must be followed when setting up an on-premises or customer-owned network.
3. What are the factors which determine the type of an on-premises or customer-owned network system that will be installed.
4. What elements must be considered to determine which an on-premises or customer-owned network architecture components relate to the larger network.
5. What are the procedures for accurately sourcing major equipment and technologies to be used in an on-premises or customer-owned network and detailing their compatibilities.
6. How the elements considered in determining an on-premises or customer-owned network architecture components affect the work to be carried out.
7. How are the appropriate resources and equipment determined when carrying out work based on organisational procedures.
8. What protocols are used to determine that the resources and equipment selected operate correctly and safely.
9. How network capacity is determined to ensure maximum performance.
10. What are the factors which need to be considered to determine product capability and calculate the allowable capability of an on- premises or customer owned network to allow for network growth.
11. Why it is important to analyse geographic, demographic, forecast and bandwidth data when formulating a plan for the implementation of a network.
12. What parameters are used to measure the requirements to manage the network capacity required by an organisation.
13. What are the monitoring techniques and recommendations that would be used in designing a deployment plan using architectural principles and assess demand to maintain the integrity of an on-premises or customer-owned network.
14. What are the requirements for implementing voice over internet protocol (VoIP) and wireless voice networks from voice networks according to organisational policies.
15. What steps should be taken to increase the possibility of a return on investment (ROI) when developing an accurate financial business case for the deployment of an on-premises or customer-owned network.
15. What are the possible situations that could occur and the solutions that can be implemented according to organisational requirements when developing a plan for the deployment of an on-premises or customer-owned network.
16. What are the key sections which should be included in the final report for the deployment of an on-premises or customer-owned network to ensure network optimal performance.



**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA45103****Identify and resolve network problems**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to troubleshoot local area network (LAN), wide area network (WAN) and wireless network problems.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |   |  |
|---|--|
| 1. Implement network monitoring             | 1.1 Plan and document the network performance review schedule according to organisational requirements and technical specifications.<br><br>1.2 Determine additional network enhancing resource requirements according to organisational requirements and technical specifications.<br><br>1.3 Set attainable targets for network performance and establish network performance reference point based on organisational requirements.<br><br>1.4 Plan and document the network performance review schedule according to organisational requirements and technical specifications.<br><br>1.5 Set up the required network monitoring logs and produce a management information base (MIB) according to organisational requirements. |
| 2. Prepare to troubleshoot network problems | 2.1 Determine major network problems according to organisational requirements.<br><br>2.2 Identify appropriate organisational and vendor support services and network resolution plan to assist in troubleshooting networks problems.<br><br>2.3 Plan and document network problem and report and record the resolution plan according to organisational requirements.   |

- 2.4 Identify and document vendor escalation steps and contacts according to organisational requirements.
- 3. Diagnose network faults
  - 3.1 Establish a concise fault hierarchy using data from previous resolution attempts.
  - 3.2 Implement progressive steps to isolate and resolve faults according to technical specifications.
  - 3.3 Document fault resolution steps according to organisational requirements.
- 4. Rectify faults
  - 4.1 Isolate repair requirements according to technical specifications.
  - 4.2 Replace and reconfigure equipment and software.
  - 4.3 Test the network and confirm fault rectification against technical requirements.
  - 4.4 Document outcomes according to organisational policies and procedures.
  - 4.5 Document user downtimes and submit reports to required personnel according to organisational procedures.
- 5. Finalise the fault rectification process
  - 5.1 Review fault resolution and determine the likelihood for reoccurrence.
  - 5.2 Determine and document planned maintenance and upgrade requirements according to organisational requirements.
  - 5.3 Submit maintenance plans to required personnel and seek and respond to feedback.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Network problems** may include but not limited to:

- Wireless network shows signal but won't connect, network outages and inaccessible files
- IP conflicts
- Slow application response
- Poor VOIP quality
- Drop in internet connectivity
- Rigid firewalls settings

**2. Fault resolution** may include but not limited to:

- Fault detection
- Fault location
- Restoration of service
- Identification of root cause of the problem
- Problem resolution

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What is the importance of planning and documenting a network performance review schedule.
2. How to determine the requirements for additional network enhancing resources.
3. How the appropriate resources and equipment are determined when carrying out monitoring activities.
4. Why it is important to set attainable targets for network performance and how to do so.
5. Why it is important to maintain a management information base and how to do so.
6. What is a network performance reference point.
7. What is the importance of planning and documenting a network performance review schedule.
8. Why it is important to identify and document vendor escalation steps and contacts and how to do so.
9. What are the possible network problems that can occur when trouble shooting a network.
10. What are the steps involved in identifying organisational and vendor support services and developing a network resolution plan.
11. What are the critical features that should be included in the creation of a plan for trouble shooting a network.
12. What types of problems may be encountered by incorrectly documenting network problem reporting and the resolution plan.
13. How to data from previous resolution attempts to establish a fault hierarchy.
14. What steps are taken to isolate and resolve network faults according to technical specifications.
15. How to isolate repair requirements to rectify faults in a network.
16. When equipment should be isolated and replaced when rectifying faults in a network.
17. How often a network should be tested and fault rectification confirmed.
18. What are the outcomes that should be documented when rectifying faults in a network.
19. What are the important details that should be part of a report to document user down time when rectifying faults on a network.
20. What are the steps entailed in reviewing fault resolution and determining the likelihood for reoccurrence.
21. How planned maintenance and upgrade requirements are determined in the rectification process.
22. Why it is important to obtain feed back on a maintenance plan when finalising the fault rectification process and how to do so.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA45203****Configure computing services**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to configure core cloud services including computing, storage, databases, and auto-scaling according to business needs and workload.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |  |   |
|--|---|
| 1. Select and secure access to the cloud environment | 1.1 Formulate and compare different cloud computing solutions, models and services according to business requirements and needs.<br><br>1.2 Identify the impact of shared security responsibility models according to organisational requirements.<br><br>1.3 Select the best cloud computing solutions and services according to business requirements and needs.<br><br>1.4 Access accounts on the cloud platform according to business requirements and needs.<br><br>1.5 Identify user access protocols and policies according to business requirements and needs.<br><br>1.6 Configure access functions within the cloud environment according to users, groups and required permissions associated with the organisation.<br><br>1.7 Define optimum workloads according to business requirements and needs. |
| 2. Deploy a virtual network                          | 2.1 Create the necessary users and groups to create and manage the infrastructure according to business requirements and needs.<br><br>2.2 Create virtual multi-tier network to support core services and auto-scaling.   |

- 2.3 Create virtual machines according to business processing and operating system requirements.
  - 2.4 Define, add and expand storage appropriately on virtual machines according to business requirements and needs.
  - 2.5 Deploy a managed database within the virtual network according to business requirements and needs.
  - 2.6 Test external network access and access between resources within virtual network and fix errors according to established requirements.
- 3. Set up automatic scaling
  - 3.1 Configure and apply auto-scaling to virtual machines to scale according to business defined metrics.
  - 3.2 Test automatic scaling and fix errors systemically as required.
- 4. Finalise a virtual network infrastructure
  - 4.1 Record and communicate work to required personnel according to organisational requirements.
  - 4.2 Seek and respond to feedback as required.
  - 4.3 Save and store user documentation according to organisational policies and procedures.



**RANGE STATEMENT**

*All range statements must be assessed:*

1. **Cloud computing solutions, models and services** may include but not limited to:
  - Infrastructure as a service
  - Platform as a service (PaaS)
  - IaaS software as a service (SaaS).
  - On-premises and private cloud, hybrid cloud, public cloud
2. **User access** may include but not limited to:
  - Separation of roles
  - Separation of responsibilities
  - Multiple domains
3. **Record and communicate** may include but not limited to:
  - Verbal
  - Non-verbal
  - Written

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What is cloud computing and what are the advantages and disadvantages to using it.
2. What are the key differences in Iaas, Paas and SaaS.
3. How to identify shared security responsibility models.
4. How cloud computing solutions can benefit a business.
5. What are the security policies, protocols and mechanisms that relate to cloud technologies.
6. What are the various ways that access functions can be designed to various users within a cloud environment.
7. What features must be considered when configuring user access in the cloud environment.
8. What is auto-scaling in cloud technology.
9. What are the functions, features and uses of different virtual machine, networking and scaling options.
10. What is virtual machine sizing in cloud technology.
11. What security policies, protocols and mechanisms relate to cloud technologies securities that should be applied to limiting network traffic within virtual networks.
12. What are the benefits of testing network access within virtual networks.
13. Why auto-scaling of virtual machines is necessary and how is it conducted.
15. Why it is necessary to record and communicate work accurately to required personnel.
16. What methods can be used to save and store user documentation when finalising a virtual network infrastructure.

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## EVIDENCE GUIDE

*For assessment purposes:*

### **(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

### **(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

### **(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA45303****Support small ICT projects**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to support the management of low risk, straightforward information, and communications technology (ICT) projects within an organisation. It applies to individuals who may work under supervision but have responsibility to ensure workflow is planned and completed in line with requirements.

ELEMENT	PERFORMANCE CRITERIA
<i>Candidates must be able to:</i>	
1. Commence project	<p>1.1 Confirm business opportunities clearly with the client to ensure project objectives are understood according to organisational requirements.</p> <p>1.2 Identify stakeholders and determine appropriate requirements according to the organisational needs.</p> <p>1.3 Prepare a project charter or proposal according to organisational objectives and obtain prompt agreement from project sponsor.</p>
2. Develop project plan	<p>2.1 Identify and analyse the requirements for tasks and resources to complete the project plan according to the needs of the organisation.</p> <p>2.2 Identify and record a schedule of project tasks, including realistic timeframes and costs as required by the organisation.</p> <p>2.3 Identify and allocate responsibilities to project team members based on the needs of the organisation.</p> <p>2.4 Agree on a process with the sponsor to manage risks or unexpected events that may arise and affect project objectives based on the requirements of the organisation.</p>

- 3. Complete project
  - 3.1 Collaborate with the project team to ensure project activities meet timeframes, scope, cost and quality expectations according to organisational needs.
  - 3.2 Monitor and control project risks and issues according to the agreed process of the organisation.
  - 3.3 Verify with appropriate persons, that project deliverables have met project expectations and sign off as complete according to organisational requirements.
  - 3.4 Train users according to organisational requirements.
- 4. Close project
  - 4.1 Prepare ICT support or maintenance documents as required according to organisational requirements.
  - 4.2 Obtain final project sign-off from sponsors and key stakeholders upon completion of the project.
  - 4.3 Document and record lessons learned and close the project.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Stakeholders:**

- Customers (internal and external), industry
- Project team
- Relevant interest groups, i.e. steering committee members
- Analysts
- Project sponsors or funding body
- Supplier or service provider

**2. Project risks and issues:**

- Cost: materials costing more than planned, resources costing more than expected
- Scope: additional tasks arising due to unexpected events required tasks missed during planning
- Time management: tasks taking longer than expected, under estimation of necessary effort

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. Why it is important to clearly confirm business opportunities with the client and how to do so.
2. Why it is important to identify stakeholders and determine appropriate requirements when commencing the project.
3. How to prepare a project charter or proposal accurately according to organisational objectives.
4. How to prepare, identify and appropriately analyse the requirements tasks and resources needed to complete the project plan.
4. Why it is important to obtain prompt agreement from project sponsors when preparing a project charter or proposal.
5. What are the steps involved in identifying and analysing the requirements for tasks and resources needed to complete a project plan according to the needs of the organisation.
6. Why it is important to identify and correctly record a schedule of project tasks, including realistic timeframes and costs as required by the organisation and how to do so.
7. What steps are involved in identifying and correctly recording a schedule of project tasks, including realistic timeframes and costs as required by the organisation.
8. Why it is important to identify and appropriately allocate responsibilities to project team members during project development.
9. What are the risks or unexpected events that may arise or internal and external environment factors that may affect project objectives during development.
10. How collaborating with the project team to support project completion can assist in meeting organisational requirements.
11. Why it is important to monitor and safely control project risks and issues according to the agreed process of the organisation.
12. What criteria must be met to ensure that project deliverables meet project expectations.
13. What factors should be taken into consideration when training users.
14. What types of information should be included in ICT support and maintenance documents.
15. Why it is important to obtain final project sign-off from sponsors and key stakeholders.
16. Why it is important to document and record lessons learned when closing the project.

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## EVIDENCE GUIDE

*For assessment purposes:*

### **(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

### **(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

### **(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.



**UA45403****Design and configure LAN and WAN networks**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to conduct an internal and outdoor site survey and design a complex local area network (WLAN). It also examines the best way computers and local area networks (LANs) can be connected to make a wide area network (WAN).

ELEMENT	PERFORMANCE CRITERIA
<i>Candidates must be able to:</i>	
1. Document current network configuration	1.1 Obtain relevant details of the current network layout and parameters according to organisational requirements.  1.2 Organise consultations with key stakeholders as required.  1.3 Record the current network configuration, network topology and facilities provided by the service provider.
2. Research client needs	2.1 Determine and record the current and future needs of the client according to organisational requirements.  2.2 Select the appropriate diagnostic tools and measurement processes according to client needs.
3. Implement a site survey	3.1 Schedule the site survey with minimum disruption to the client according to organisational requirements.  3.2 Undertake the site survey and ensure a safe working environment for users and survey personnel according to organisational health and safety requirements.  3.3 Record and document infrastructure, building use, aesthetics and other issues that will impact on future network performance and acceptance by the client

- 3.4 Record and document interference issues and sources that may impact on network performance and the possible resolutions according to organisational requirements
  - 3.5 Document and configure results of the site survey according to organisational requirements.
- 4. Provide secure connectivity for remote access
  - 4.1 Determine the appropriate tools for remote connectivity and security according to organisational requirements.
  - 4.3 Install and configure remote access according to organisational requirements.
  - 4.4 Review and analyse the performance of remote access according to the organisational needs.
- 5. Model and simulate networks
  - 5.1 Determine appropriate test modelling tools according to organisational needs.
  - 5.2 Determine estimated network traffic and planned growth based on organisational requirements.
  - 5.3 Test the planned network using modelling and simulation tools and consistently simulate scenarios according to the organisational requirements.
  - 5.4 Document and record the outcome of tests and revise design where required according to organisational procedures.
- 6. Determine components for networks
  - 6.1 Assess client needs and test results to determine the appropriate vendor product and equipment required according to organisational requirements.
  - 6.2 Finalise and record the components list for suitability and vendor claims according to organisational needs.
  - 6.3 Prepare a feasibility proposal based on organisational needs.

- 7. Identify WAN needs
  - 7.1 Estimate traffic content and volumes according to expected organisational usage.
  - 7.2 Develop an appropriate organisational WAN plan according to organisational needs.
- 8. Create WAN specifications
  - 8.1 Determine the resource requirements for each network segment based on the functional analysis for the organisation.
  - 8.2 Select a WAN service appropriate to the volume and type of traffic expected to access the WAN according to organisational requirements.
  - 8.3 Select the appropriate redundant links to be included in the proposed WAN connectivity purposes.
  - 8.4 Document and record appropriate WAN specifications according to the needs of the organisation.

## RANGE STATEMENT

*All range statements must be assessed:*

**1. Key stakeholders** may include but not limited to:

- Customer
- User
- Project management
- Analyst
- Developer
- Quality assurance

**2. Needs of the client** may include but not limited to:

- Small office home office (SOHO)
- Enterprise local area networks (LANs)
- Transmission control protocols or internet protocols (TCP/IP) and applications
- Wireless security strategies
- Security threats

**3. Site survey** may include but not limited to:

- Passive survey
- Active survey
- Predictive survey

**4. Appropriate tools** may include but not limited to:

- VPN
- Internet
- Protocols and security
- Encryption
- Firewall
- Routers
- Firmware
- Remote software

**5. Resource requirements** may include but not limited to:

- Constraints and costs
- Features of telecommunications infrastructure including the difference between digital and analogue networks
- Growth projections and capacity planning
- High or low speed links
- Protocols
- Redundancy paths
- Response time and reliability requirements
- Scope of operation
- Security
- Traffic flow patterns/traffic load
- Users and the applications expected

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. Why it is necessary to obtain details of the current network layout and parameters when configuring networks and how this is done.
2. What are the benefits of holding meetings with key stakeholders during the documentation process of configuring networks.
3. What are network topologies and how network topology links are used in network configuration.
4. What factors should be considered when conducting research to identify and determine the client's needs.
5. What are the possible current and future needs of clients in configuring WAN and LAN networks.
6. What are network diagnostic tools and how they are used when implementing site surveys.
7. What are site surveys and how they are used in the configuration of networks.
8. What types of equipment should be selected and calibrated when implementing site surveys.
9. Why it is important to schedule and undertake site surveys with minimum disruption to the client.
10. How to ensure a safe working environment for users and survey personnel when undertaking site surveys.
11. Why it is important to accurately record infrastructure, building use, aesthetics and other issues when implementing site surveys and how is this done
12. Why it is important to accurately record and document the results of site surveys in network configuration.
13. How to determine the appropriate tools for remote connectivity and security and why is it important to do so.
14. What are the steps involved in installing and configuring remote access according to the needs of the organisation.
15. Why it is important to analyse the performance of remote access based on the needs of the organisation.
16. How the appropriate test and modelling routines are determined when modelling wireless local area networks.
17. How network traffic and planned growth is determined when modelling networks.
18. Why it is important to test the planned network using modelling and simulation tools, consistently simulate scenarios and how this is done.
19. Why it is important to document and record possible outcomes that can occur and revise the design when modelling networks.
20. How the documented and recorded information from possible outcomes during the modelling of networks can be used within the organisation.
21. Why it is important to assess client needs and test results to determine the appropriate vendor product and equipment required and how to do so.

22. What steps are involved in preparing a feasibility proposal and why is it important to prepare one.
23. How sustainable compatibility and economic running costs are decided when determining network components.
24. What is the process for finalising the components list for suitability and vendor claims according to organisational needs.
25. How implementation plans for determining components for a network are developed.
26. What is the process for estimating traffic content and volumes according to expected organisational usage when examining telecommunications infrastructure.
26. Why it is important to develop an organisational WAN plan and how is it done.
28. What are the possible resource requirements for LAN, WAN or VPN segment on the basis of functional analysis and how they are determined.
29. What is the process involved in selecting a WAN service appropriate to the volume and type of traffic expected to access the WAN.
30. Why it is important to include redundant links in the proposed WAN connectivity and how it is done.
31. Why it is important to document and report appropriate WAN specifications and how this information can be used in the organisation for configuring networking.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA45503****Provide ICT support and training to clients**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to provide advice and support to clients including the communication of comprehensive technical information. This unit applies to individuals in the information and communication technology (ICT) industry

ELEMENT	PERFORMANCE CRITERIA
<i>Candidates must be able to:</i>	
1. Manage customer support requirements	1.1 Check for new problems logged by the client according to organisational requirements. 1.2 Check previous logs for similar problems according to the needs of the client. 1.3 Investigate and document support issues affecting the client according to organisational requirements. 1.4 Notify the client of the results of the investigation and provide advice and support on findings according to organisational procedures. 1.5 Obtain and record client feedback and make appropriate changes according to organisational procedures.
2. Provide advice on software, hardware or network	2.1 Confirm software, hardware or network software with the client based on organisational requirements. 2.2 Investigate and document solutions according to organisational procedures. 2.3 Document additional requirements discovered in the investigation and refer them to the client according to organisational procedures.



- 2.4 Obtain approval from the client to implement the solution in a timely manner according to organisational requirements.
  - 2.5 Investigate and document the amount of technical support required by the client according to organisational requirements.
  - 2.6 Discuss and agree the level of technical support to be delivered with the client.
  - 2.7 Provide support to the client at appropriate times according to organisational requirements.
  - 2.8 Implement end-point security according to organisational requirements
  - 2.9 Provide appropriate technical support and training as part of group or one-to-one instruction to the client according to organisational procedures.
  - 2.10 Provide concise manuals and support documentation to the client according to organisational requirements.
- 3. Obtain client feedback
  - 3.1 Create an appropriate evaluation form or other mechanism to gather feedback about the solution and support given according to client requirements.
  - 3.2 Provide the client with clear instructions on how to complete the form or use other means of providing feedback.
  - 3.3 Provide the evaluation or feedback form to the client according to organisational requirements.
  - 3.4 Review feedback from the client to identify areas for improvement.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Client** may include but not limited to:

- Internal departments
- Employees
- External organisations

**2. Advice and support** may include but not limited to:

- Provision of
  - client documentation
  - manuals
  - one on one training
- Identification of training needs for referral of supervisor
- Documentation from vendor
- Advice on software supported by the organisation, including but not limited to use of macros, statistical functions of spreadsheets, creation of templates, generation of a complex report on a database, password and log-on procedure
- Advice on hardware supported by the organisation, including but not limited to printers, laptops, notebooks, CD-ROM, screens, disk drives, reconfiguration of settings, operation of scanners

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. Why it is important to check for new problems logged by the client and previous logs for similar problems and how to do so.
2. What are the different methods of investigation when providing ICT support.
3. Why it is important to document the results of the investigation of support issues affecting the client and what are the requirements for doing so
4. How to notify clients of the results of the investigation and provide advice and support on findings.
5. Why it is important to obtain client feedback and make appropriate changes after the investigation and how to do so.
6. Why it is important to confirm software, hardware or network software with the client and how to do so.
7. What types of information should be documented when providing advice on software and hardware requirements to clients.
7. Why it is important to obtain client approval before implementing solutions resulting from prior investigations on hardware and software requirements and how to do so.
8. Why it is important to investigate, document, discuss and agree with the client on the amount of technical support required and how to do so.
9. What types of investigations can be conducted to determine the level of end-point security and technical support required.
10. What are the possible consequences of providing support without first determining the best time to carry out the activity.
11. What are the advantages and disadvantages of providing technical support and training as part of a group and one-on-one instructions to the client.
12. What type of information should be included in the help manuals provided to clients.
13. Why feedback/evaluation forms are important after a solution or support has been provided for the client and how the information gathered can be used.
14. What type of instructions should be provided with the feedback/evaluation form and why this is important.
15. How feedback/evaluation forms should be distributed to clients and how the information gathered from the feedback should be used.
16. Why it is important to obtain and review feedback from clients and how to do so.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.

**UA45603****Prepare disaster recovery contingency plans**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to analyse the impact of systems on the organisation and carry out risk analyses and disaster planning for projects.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |  |  |
|--|--|
| 1. Evaluate the impact of systems on business continuity | 1.1 Identify critical business functions after consultation with the client according to the needs of the organisation.<br><br>1.2 Identify and record data and software processes from project documentation.<br><br>1.3 Assess the potential impact of failure of the information technology system to business functions according to organisational requirements.<br><br>1.4 Identify and evaluate contingency possibilities according to organisational requirements. |
| 2. Monitor threats to systems                            | 2.1 Identify threats to systems taking into consideration security analyses and the internal and external business environment.<br><br>2.2 Evaluate alternatives to minimise risks.  |
| 3. Formulate a prevention and recovery strategy          | 3.1 Identify and evaluate prevention and recovery options to support critical business functions.<br><br>3.2 Design built-in contingency plans into systems and confirm that current sites are in accordance with the appropriate acceptance criteria.<br><br>3.3 Prepare and submit disaster recovery plans and prevention strategies to appropriate higher authorities for approval.   |

## RANGE STATEMENT

*All range statements must be assessed:*

**1. Critical business functions** may include but not limited to:

- Financial transactions
- Customer services
- Payroll

**2. Client** may include but not limited to:

- Department(s) within an organisation
- Businesses requiring e-commerce solutions
- Third party

**3. Threats** may include but not limited to:

- Physical (weather, earthquake, flooding)
- Security
- Information technology failure (equipment)
- Accidents
- Espionage/sabotage (hackers)
- Telecommunication network failure
- Denial of service
- Virus attack

**Security** may include but not limited to:

- Relevant laws pertaining to
  - customs
  - expertise
  - threats t security
- Organisational security policies
- Expertise/knowledge that or may be relevant
- Threats to security which is or is held to be present in the environment

**4. Business requirements** may include but not limited to:

- Back-up
- Storage and recovery of data
- Access to internal network passwords/logons
- Firewalls
- Hacking/confidentiality availability
- Integrity
  - data integrity during
    - storage
    - processing
    - while in transit
  - system integrity)
- Privacy legislation
- Industry-imposed controls and standards
- Laws regarding confidentiality and reporting of data

**5. Site** may include but not limited to:

- Location
- Size
- Power
- Cabling
- Air conditioning
- Floor level

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. Why it is important to identify critical business functions appropriately and how to do so.
2. How information gathered from discussions with clients and information from project documentation can be useful in identifying business functions.
3. What factors should be considered when identifying and systemically recording critical data and software from project documentation
4. How can the possible impact of failure of the information technology system to business functions be assessed.
5. What steps are involved in identifying and evaluating contingency possibilities according to the requirements of the organisation.
6. How can threats to the system be identified while taking into consideration security analysis and internal and external business environments.
7. Why it is important to systemically evaluate, alternatives to minimise risk based on the organisation and how to do so
8. When should a prevention and recovery system be formulated and how to do so.
9. Why it is important to identify and evaluate prevention and recovery options to support critical business functions and how to do so.
10. What factors need to be considered when designing contingency plans for information technology systems that support business functions of the organisation.
11. Why it is important for the built-in contingency plan to be in accordance with the appropriate acceptance criteria and how to ensure that this is done.
12. What are the strategies and steps that should be used to prepare a disaster recovery contingency plan.
13. Who are the appropriate personnel to whom the disaster recovery and prevention strategy should be submitted and why.

**EVIDENCE GUIDE**

*For assessment purposes:*

**(1) Critical Aspects of Evidence**

Candidates must prove that they can carry out **all** the elements, meeting all of the performance criteria, range and underpinning knowledge on more than one occasion. This evidence must come from a real working environment.

**(2) Methods of Assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

**(3) Context of Assessment**

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation must not be used, except in exceptional circumstances where natural work evidence is unlikely to occur.



**UA45703****Plan and assign work**

Unit Descriptor:

This unit describes the knowledge, skills and attitudes required to ensure that the work required of the team is effectively and fairly allocated, taking account of workloads and opportunities for development.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |                             |  |
|-----------------------------|--|
| 1. Plan work for the team   | 1.1 Clarify and confirm the required work of the team, including outstanding points and issues,<br><br>1.2 Plan work to be undertaken and identify priorities or critical activities, making use of available resources.<br><br>1.3 Allot work to team members taking into account skills, knowledge, attitudes, background, existing workloads and opportunities for development. |
| 2. Allocate work            | 2.1 Brief team members on the work allocated and the expected standard of performance.<br><br>2.2 Encourage team members to ask questions, make suggestions and seek clarification in relation to work allocated.<br><br>2.3 Address the concerns of team members about work   |
| 3. Improve team performance | 3.1 Identify ways of improving team performance.<br><br>3.2 Provide team members with objectives and valid and specific feedback to improve performance.<br><br>3.3 Identify and implement ways of improving team performance.   |

**RANGE STATEMENT**

*All range statements must be assessed:*

1. **Improve team performance** may include but not limited to:
  - Training
  - One-on-one discussions
  - Feedback on overall team performance
  - Team talks and meetings

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**UNDERPINNING KNOWLEDGE AND SKILLS**

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*Candidates must know and understand:*

1. Why it is important to plan, confirm and clarify priorities and critical activities with the manager and how to do this effectively.
2. How to identify available resources.
3. Why and how work should be allocated fairly.
4. Why and how to brief team members on the work and what is the standard or level of expected performance.
5. How to encourage team members to ask questions, seek clarification and make suggestions in relation to work allocated.
6. How to address the concerns of team members about work allocated.
7. What are the organisation's policies and procedures for personal and professional development.
8. What are the reporting lines in the organisation and the limits of your own authority.
9. What are the organisation's standards or levels of expected performance.

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## EVIDENCE GUIDE

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*For assessment purposes:*

### (1) Critical Aspects of Evidence

Candidates have to prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real work environment.

### (2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

### (3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is, the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

**U83504****Lead your team**

Unit Descriptor:

This unit describes the knowledge, skills and attitudes required to provide direction to members of a team, motivate and support them to achieve both team objectives and individual work objectives.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |                         |   |
|-------------------------|---|
| 1. Plan work            | 1.1 Communicate the purpose and objectives of the team to all members.<br><br>1.2 Involve team members in planning how the team will achieve its objectives.<br><br>1.3 Give team members individual work objectives and ensure that they understand how these contribute to achieving team and organisational objectives.  |
| 2. Support team members | 2.1 Encourage team members to achieve individual work objectives and those of the team and are given recognition when objectives have been achieved.<br><br>2.2 Guide team members through difficulties and challenges.<br><br>2.3 Acknowledge creativity and innovation within the team.<br><br>2.4 Empower team members to develop their own ways of working and to make decisions within agreed boundaries.<br><br>2.5 Encourage team members to take responsibility for their development needs.<br><br>2.6 Provide support and advice to team members when required, especially during periods of setback and change.<br><br>2.7 Motivate team members to present their own ideas and listen to their ideas. |

- 2.8 Encourage team members to take the lead when they have the knowledge and expertise and show a willingness to accept leadership.
- 2.9 Obtain the trust and support of team members in response to the leader's support and behaviour.

## RANGE STATEMENT

*All range statements must be assessed:*

1. **Purpose** may include but not limited to:
  - Assuring that objectives have been achieved
  - Assuring that quality and customer requirements have been met
  - Appraising team or individual performance
  - Recognising competent performance and achievement
2. **Team members** may include but not limited to:
  - Persons for whom you have line responsibility
3. **Planning** may include but not limited to:
  - Short-term
  - Medium-term
  - Long-term

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What are the different ways of communicating effectively with members of a team.
2. How to set objectives which are SMART (Specific, Measurable, Achievable, Realistic and Time-bound).
3. How to plan for the achievement of team objectives and the importance of involving team members in this process.
4. What is the importance of demonstrating to team members how personal work objectives contribute to the achievement of team objectives.
5. How to get and make use of feedback from others on your leadership performance and style of leadership.
6. How to select and successfully apply methods for motivating, supporting and encouraging team members and acknowledging their achievements.
7. What are the types of difficulties and challenges that may arise and the ways in which these can be identified and addressed.
8. Why it is important to encourage others to take the lead and the ways in which this can be achieved.
9. How to encourage and recognise creativity and innovation within a team.
10. Who are the individuals within your own team, their roles, responsibilities, competencies and potential.
11. What are your team's purpose, objectives and plans.
12. What are the personal work objectives of your team members.
13. What are the types of support and advice that team members are likely to need and how to respond to those needs.



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## EVIDENCE GUIDE

*For assessment purposes:*

### (1) Critical Aspects of Evidence

Candidates have to prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than two occasions**. This evidence must come from a real work environment.

### (2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

### (3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is, the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulated activities **are not** permitted for this unit.

## U92502

## Maintain safe and effective working practices

Unit Descriptor:

This unit describes the knowledge, skills and attitudes required to function within health and safety standards. Candidates are required to demonstrate that they are able to work effectively and efficiently with colleagues, supervisors and customers. It also highlights the need for individuals to take responsibility for self-development in the workplace.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Maintain the safety of self and others in the workplace</li> </ol> | <ol style="list-style-type: none"> <li>1.1 Work according to training and instructions received to avoid risk to self and others.</li> <li>1.2 Wear the appropriate personal protective equipment according to organisational procedures.</li> <li>1.3 Use approved methods and handling equipment when moving and lifting items.</li> <li>1.4 Use appropriate equipment and materials according to organisational requirements and manufacturer's instructions.</li> <li>1.5 Return equipment and materials to designated storage when not in use.</li> <li>1.6 Keep the immediate work area tidy and free from hazards.</li> <li>1.7 Dispose of waste in a designated area, in accordance with organisational procedures, and environmental and industry regulations.</li> <li>1.8 Perform work in a manner which minimises environmental damage and contributes to the improvement of environmental work practices.</li> <li>1.9 Report accidents, incidents or problems to appropriate persons and take immediate action to reduce further danger.</li> </ol> |
|--|---|

- 1.10 Carry out work in an organised and efficient manner in accordance with specified procedures.
- 2. Maintain working relationships with others
  - 2.1 Maintain appropriate and effective working relationships with others.
  - 2.2 Carry out activities requiring cooperation with others in accordance with required procedures.
  - 2.3 Handle disagreements and in accordance with organisational procedures.
  - 2.4 Communicate and in a manner which promotes effective working relationships.
- 3. Maintain and develop personal performance
  - 3.1 Take responsibility for tasks and activities in accordance with organisational requirements, either alone as part of a team.
  - 3.2 Seek advice from appropriate persons if clarification is required concerning specific tasks.
  - 3.3 Review personal performance and development with the appropriate persons at suitable times.

**RANGE STATEMENT**

*All range statement items must be assessed:*

**1. Personal protective equipment** may include but not limited to:

- Ear protection
- Gloves
- Footwear
- Overalls/coveralls
- Helmets/hats
- Eye protection i.e. goggles/glasses

**2. Equipment** may include but not limited to:

- Manual
- Electronic

**3. Waste** may include but not limited to:

- Solid
- Liquids
- Hazardous/toxic

**4. Others** may include but not limited to:

- Colleagues
- Supervisors
- Customers

**5. Personal performance and development** may include but not limited to:

- Productivity
- Quality of work

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. How to carry out work activities avoiding risk to self and others.
2. What are the basic requirements of the health and safety, other legislation and regulations that apply to the workplace.
3. What are the organisational requirements for the use of personal protective equipment.
4. How to select and use the correct personal protective equipment.
5. What is the relevant, up-to-date information on health, safety and security and how it applies in the workplace.
6. Why it is important to be alert to health, safety and security hazards.
7. What are the common health, safety and security hazards that affect persons working in this role and how these should be identified.
8. Why it is important to warn others about hazards and how to do so until the hazard is dealt with.
8. Why it is important to use safe lifting techniques.
9. What are the correct and safe ways to use equipment and materials required for the work.
10. What are safe methods and areas for the storage of equipment and materials.
11. What are the organisational and legislative requirements for disposing of waste safely.
12. What health and safety records may need to be kept and how to do so.
13. How the conditions under which you work can affect the efficiency and effectiveness of yourself and those around you.
14. What methods should be used to promote good environmental practice and to minimise environmental damage while working.
15. What procedures should be used for different types of emergencies in the industry.
16. Why is important to develop and maintain effective working relationships and how to do so.
17. What procedures should be used in dealing with workplace disagreements.
18. Why it is important to communicate effectively and what are the available methods to do so.
19. How to maintain security in the work area.

## EVIDENCE GUIDE

*For assessment purposes:*

### (1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** of the performance criteria, range and underpinning knowledge on **more than one occasion**. This evidence must come from a real working environment.

### (2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Witness testimony
- Written evidence (work records, reports)
- Professional discussion

### (3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation may be used to cover **PCs 1.9 and 2.3**.

**UA45803****Develop an entrepreneurial strategy**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to develop an entrepreneurial strategy to complement management competencies and experience necessary for entrepreneurs to meet the requirements and demands of a specific opportunity.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |  |  |
|--|--|
| 1. Identify the nature of entrepreneurship             | 1.1 Establish the main concepts associated with entrepreneurship.<br><br>1.2 Determine factors which influence entrepreneurship locally and regionally.<br><br>1.3 Ascertain the importance of entrepreneurship to economic development and employment.<br><br>1.4 Present the findings of research conducted on entrepreneurial ventures and successes in the Caribbean region.<br><br>1.5 Research and confirm the differences between wage employment and entrepreneurial ventures. |
| 2. Identify and assess entrepreneurial characteristics | 2.1 Conduct relevant research and confirm required entrepreneurial characteristics.<br><br>2.2 Assess and rank identified entrepreneurial characteristics.<br><br>2.3 Verify the process and discipline that enables individuals to evaluate and shape choices and initiate effective action.<br><br>2.4 Identify factors that will assist in managing risks and uncertainties of the future while maintaining a future orientated frame of mind.                                      |

- |                                      |   |
|--------------------------------------|---|
| 3. Develop a self-assessment profile | 3.1 Use relevant self-assessment tools/methods to identify personal entrepreneurial potential.  |
|                                      | 3.2 Apply problem-solving techniques and principles to solve business related problems.   |
|                                      | 3.3 Obtain appropriate feedback from others to identify blind spots and reinforce or change existing perceptions of strengths or weaknesses.            |
| 4. Craft an entrepreneurial strategy |   |
|                                      | 4.1 Develop a profile of the past that includes accomplishments, preferences and work styles and identify what one would like to achieve in the future. |
|                                      | 4.2 Identify and accept personal responsibility in areas for development to determine commitment, perseverance and orientation towards goals.           |
|                                      | 4.3 Develop written guidelines to obtain honest, straightforward and helpful feedback that is both positive and negative to facilitate reviews.         |
|                                      | 4.4 Develop a framework and process of setting goals which demands time, self-discipline, commitment, dedication and practice.                          |
|                                      | 4.5 Establish goals that are specific, measurable, achievable, realistic and time oriented.   |
|                                      | 4.6 Establish how priorities including identifying conflicts and trade-offs may be resolved.  |
|                                      | 4.7 Identify potential problems, obstacles and risks in meeting goals.  |
|                                      | 4.8 Identify specific action steps that are to be performed to accomplish goals.  |



- 4.9 Indicate the methods by which results will be measured.
- 4.10 Establish milestones for reviewing progress and align these to specific dates on a calendar.
- 4.11 Identify required resources and relevant sources to obtain them.

Review processes and periodically revise goals to ensure that they are achieved.

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Concepts** may include but not limited to:

- Risk
- Entrepreneurship
- Macro-screening
- Micro-screening
- Competition
- Wage employment

**2. Factors** may include but not limited to:

- Market conditions
- Markets - demand/supply
- Global trends
- Level of economic activities
- Funding
- Economic stability
- Social stability
- Resources available

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What is a personal entrepreneurial profile system.
2. Explain the following effective management systems.
  - Marketing
  - Operations/productions
  - Finance
  - Administration
  - Law
3. How to measure feedback.
4. What are the methods for developing a personal business plan.
5. What is the difference between entrepreneurial and management culture.
6. How to determine barriers to entrepreneurship.
7. How to minimise exposure to risk.
8. How to exploit any available resource.
9. How to tailor a reward system to meet a particular situation.
10. How to effectively plan and execute activities.
11. How to use computer technology to undertake assessments.

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## EVIDENCE GUIDE

*For assessment purposes:*

### (1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** the elements, meeting **all** the performance criteria, range and underpinning knowledge. This evidence must come from a real working environment.

### (2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Products of work
- Observation
- Written/ oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

### (3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used** except in exceptional circumstances where natural work evidence is unlikely to occur.

**U68402****Contribute to the protection of the environment**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to conduct work activities in a manner that protects the environment. Candidates should take steps to minimise any negative impact on the environment by completing tasks and activities in a way which causes as little damage or disturbance as possible to the environment while following organisational procedures.

**ELEMENT****PERFORMANCE CRITERIA**

*Candidates must be able to:*

- |  |  |
|--|--|
| 1. Work in an environmentally conscious way                            | 1.1 Perform duties in accordance with relevant policies and legislation.<br><br>1.2 Execute duties in a manner which minimises environmental damage.<br><br>1.3 Operate and handle equipment and materials in a manner that minimises environmental damage.  |
| 2. Contribute to continuous improvements in protecting the environment | 2.1 Identify instances of likely or actual environmental damage and take appropriate action.<br><br>2.2 Identify improvements to procedures and practices in terms of good environmental practice and report to relevant persons.<br><br>2.3 Dispose of hazardous and non-hazardous waste according to approved legislative procedures and practices.<br><br>2.4 Contribute to sustainable development particularly in the conservation of energy, water, use of resources and equipment to minimise environmental damage. |

**RANGE STATEMENT**

*All range statements must be assessed:*

**1. Relevant policies and legislation** may include but not limited to:

- Organisational policies
- Health and safety at work
- Environmental legislation
- Solid waste management policies
- Recyclable policies

**2. Manner which minimises environmental damage** may include but not limited to:

- Using recycled/reused items and materials where appropriate
- Disposing of polluting substances safely
- Reducing the volume of waste
- Using biodegradable and eco-friendly chemicals
- Planning tasks to reduce the use of fuel and electricity

**3. Equipment and materials** may include but not limited to:

- Hand tools
- Power tools
- Personal protective equipment
- Cleaning chemicals
- Soaps and sanitisers
- Paper towels
- Garbage disposal bags
- Cloths and towels
- Containers
- Access equipment

**4. Hazardous waste** may include but not limited to:

- Oils
- Chemicals and solutions
- Harmful materials (asbestos, fibreglass)
- Electronic equipment
- Organic hazards (pest excrement, pest carcasses)

**5. Non-hazardous waste** may include but not limited to:

- Food
- Plant matter
- Paper

**UNDERPINNING KNOWLEDGE AND SKILLS**

*Candidates must know and understand:*

1. What are the relevant policies and legislation governing environmental protection.
2. How to identify any likely or actual environmental damage
3. What are the appropriate actions to take in the discovery of likely or actual environmental damage.
4. What are the ways in which tools and materials should be used to minimise environmental damage.
5. What are the different types of pollution.
6. What are the consequences of pollution.
7. How to recognise wastage of energy, water, equipment and materials.
8. What are the methods of working that will minimise pollution and wastage of resources.
9. What are the types of damage which may occur, the impact these can have on the environment and corrective actions to be taken.
10. What are the methods of waste disposal which will minimise the risk to the environment.
11. What are the organisational requirements to prevent wastage.

## EVIDENCE GUIDE

*For assessment purposes:*

### (1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** the elements, meeting **all** of the performance criteria, range and underpinning knowledge **on no less than three (3) occasions**. This evidence must come from a real working environment.

### (2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Witness testimony
- Personal statement
- Written evidence (projects or assignments)
- Case study and scenario analysis
- Role play/simulation

### (3) Context of Assessment

This unit may be assessed on the job, off the job or using a combination of both. Where assessment occurs off the job, that is, the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, products and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **must not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.



**Assessment methods**

The methods which can be used to determine competence in performance and underpinning knowledge.

**Assessors**

The Assessor's role is determined whether evidence presented by a candidate for assessment within the programme, meets the required standard of competence in the relevant unit or element. The Assessor needs to be competent to assess to national standards in the area under assessment.

**Approved Centre**

Organization/Centre approved by the TVET Council to offer full National Vocational Qualifications.

**Case Studies**

In situations where it is difficult for workplace assessment to take place, case studies can offer the candidate an opportunity to demonstrate potential competence.

A case study is a description of an actual or imaginary situation presented in some detail. The way the case study is presented will vary depending upon the qualification, but the most usual methods are written, taped or filmed.

The main advantage of a case study is the amount of evidence of underpinning knowledge they can generate and the specific nature of the evidence produced.

**Competence**

In the context of vocational qualifications, competence means: the ability to carry out prescribed activities to nationally pre-determined standards in an occupation. The definition embraces cognitive, practical and behavioural skills, underpinning knowledge and understanding and the ability to react appropriately in contingency situations.

**Element**

An element is a description of an activity which a person should be able to do. It is a description of an action, behaviour or outcome which a person should be able to demonstrate.

**Explanation of NVQ Levels**

NVQs cover five (5) levels of competence, from entry level staff at Level 1 through to senior management at Level 5.

**Level 1 - Entry Level**

Recognizes competence in a range of varied work activities performed in a variety of contexts. Most work activities are simple and routine. Collaboration with others through work groups or teams may often be a requirement. Substantial supervision is required especially during the early months evolving into more autonomy with time.

**Level 2 - Skilled Occupations:**

Recognizes competence in a broad range of diverse work activities performed in a variety of contexts. Some of these may be complex and non-routine and involve some responsibility and autonomy. Collaboration with others through work groups or teams and guidance of others may be required.

**Level 3 - Technician and Supervisory Occupations:**

Recognizes competence in a broad range of complex, technical or professional work activities performed in a wide variety of contexts, with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources are often a requirement. The individual is capable of self-directed application, exhibits problem solving, planning, designing and supervisory capabilities.

**Level 4 - Technical Specialist and Middle Management Occupations:**

Recognizes competence involving the application of a range of fundamental principles and complex techniques across a wide and unpredictable variety of contexts. Requires very substantial personal autonomy and often significant responsibility for the work of others, the allocation of resources, as well as personal accountability for analysis, diagnosis, design, planning, execution and evaluation.

**Level 5 - Chartered, Professional and Senior Management Occupations:**

Recognizes the ability to exercise personal professional responsibility for the design, development or improvement of a product, process, system or service. Recognizes technical and management competencies at the highest level and includes those who have occupied positions of the highest responsibility and made outstanding contribution to the promotion and practice of their occupation.

**External Verifier**

The External Verifier is trained and appointed by the TVET Council and is competent to approve and ensure an approved Centre's quality of provision.

**Internal Verifier**

The Internal Verifier acts in a supporting role for Assessors to ensure consistent quality of assessment and competence. They need to be competent to assess to national standards in the area under assessment.

**NVQ**

National Vocational Qualifications (NVQs) are work-based qualifications that assess an individual's competence in a work situation and certify that the individual can perform the work role to the standards expected in employment.

NVQs are based on national occupational standards of competence drawn up by standards-setting bodies known as Industry Lead Bodies. The standards describe the level and breadth of performance that is expected of persons working in the industry or sector which the NVQ covers.

**NVQ Coordinator**

Within each approved Centre offering NVQs, there is a centre contact who has overall responsibility for the operation and administration of the NVQ system.

**Observation**

Observation of the candidate carrying out his/her job in the workplace is the assessment method recommended in the vast majority of units and elements. Observation of staff carrying out their duties is something that most supervisors and managers do every day.

**Performance criteria**

Performance criteria indicate what is required for the successful achievement of an element. They are descriptions of what you would expect to see in competent performance.

**Product of Work**

This could be items produced during the normal course of work, which can be used for evidence purposes such as reports, menus, promotional literature, training plans, etc.

**Questioning**

Questioning is one of the most appropriate ways to collect evidence to assess a candidate's underpinning knowledge and understanding.

Questioning can also be used to assess a candidate in those areas of work listed in the range which cannot be assessed by observation. Guidance on when this assessment method can be used is given in the assessment guidance of each individual element.

As an assessment method, questioning ensures you have all of the evidence about a candidate's performance. It also allows you to clarify situations.

**Range statements**

The range puts the element of competence into context. A range statement is a description of the range of situations to which an element and its performance criteria is intended to apply.

Range statements are prescriptive therefore each category must be assessed.

**Role-plays**

Role-plays are simulations where the candidate is asked to act out a situation in the way he/she considers “real” people would behave. By using role-play situations to assess a candidate you are able to collect evidence and make a judgment about how the candidate is most likely to perform. This may be necessary if the range specified includes a situation in which the candidate is unlikely to find himself/herself in the normal course of their work, or where the candidate needs to develop competence, before being judged competently, for example, in a disciplinary situation,

**Simulations**

Where possible, assessment should always be carried out by observing **natural performance** in the workplace. **Simulated performance**, however, can be used where specified to collect evidence about an aspect of the candidate’s work which occurs infrequently or is potentially hazardous; for example, dealing with fires.

By designing the simulated situation, briefing the candidate and observing his/her performance, you will be able to elicit evidence which will help you judge how a candidate is **most likely** to perform in real life.

**Supplementary evidence**

Supplementary evidence can be used to confirm and support performance evidence. Types of supplementary evidence include witness testimonies, reports, journals or diaries, records of activities, personal statements, simulation (see note in glossary).

**Underpinning knowledge**

Underpinning knowledge indicates what knowledge is essential for a person to possess in order to successfully achieve an element and prove total competence.

**Units**

A unit of competence describes one or more activities which form a significant part of an individual’s work. Units are accredited separately but in combination can make up a vocational qualification. There are three categories of units:

**Mandatory units** - are core to a qualification and must to be completed.

**Optional units** - candidates must choose the required number of individual units, specified in the qualification structure, to achieve the qualification.

**Additional units** - are units which the candidate can undertake but are not a requirement to achieve a qualification

### **Work-based projects**

Work-based projects are a useful way for you to collect evidence to support any decision you make about a candidate's performance. They are particularly appropriate in determining the level of a candidate's underpinning knowledge and understanding where it may be insufficient to rely only on questioning observation.

A project often involves the identification of a solution to a specific problem identified by you and/or the candidate (such as looking at ways to redress a recent drop in sales), or may be a structured programme of work built around a central situation or idea (such as the introduction of a new job rostering process).