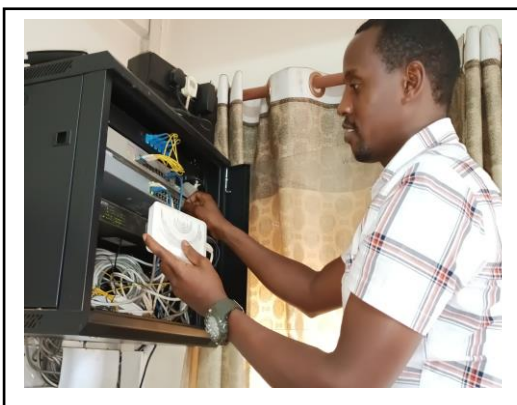




**THE REPUBLIC OF UGANDA**  
**Ministry of Education and Sports**

**Business, Technical, Vocational Education and Training [BTJET] Subsector  
Reform**



**Assessment and Training  
Package**

**For**

**NETWORK  
ADMINISTRATOR**

**Qualification Level: 1**

**Occupational Cluster: Information and  
Communication  
technology**

**January 2022**

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**Developed by:**

**Qualifications Standards Department  
Directorate of Industrial Training**

**Funded by:**

**Government of Uganda**

## DIRECTORATE OF INDUSTRIAL TRAINING

Plot 97/99 Jinja Road/Corner 3<sup>rd</sup> Street,  
P.O Box 20050, Lugogo, Kampala, Uganda  
Tel: 256-414-251256; 256-414-259412;  
E-mail: [uvqf.dit@gmail.com](mailto:uvqf.dit@gmail.com)

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Under BTVET Act, 2008 the functions of the Directorate of Industrial Training are:

- (a) To identify the needs of the labour market for occupational competencies that fall under the UVQF;
- (b) To regulate apprenticeship schemes;
- (c) To foster and promote entrepreneurial values and skills, as an integral part of the UVQF;
- (d) To secure adequate and sustainable financing for the efficient operations of the Directorate;
- (e) To accredit training institutions or companies as assessment centers;
- (f) To determine fees payable under the Act;
- (g) To develop, apply, expand and improve the purposeful application of Uganda Vocational Qualifications defined in the UVQF;
- (h) To assess and award Uganda Vocational Qualifications;
- (i) To promote on-the-job training in industry for apprenticeship, traineeship and indenture training and for other training such as further skills training and upgrading; and
- (j) To prescribe the procedure for the making of training schemes

Further to the above provisions, there is an established Uganda Vocational Qualifications Framework (UVQF), under part V of the BTVET Act, 2008. It is stated that:

The purpose of the UVQF is to define:

- (a) Occupational standards in the world of work;
- (b) Assessment standards;
- (c) Vocational qualifications of learners who meet the set standards of different studies;
- (d) Provide guidelines for modular training.

The UVQF shall follow principles of Competence Based Education and Training (CBET) which include:

- (a) Flexible training or learning modules;
- (b) Positive assessment and Certification;
- (c) Assessment of Prior Learning;
- (d) Recognition of formal and non-formal training;
- (e) Self-paced or individual learning; and
- (f) Work place learning

For award and recognition of certificates, the BTVET Act, 2008 provides that:

- (1) The Directorate and other Examination Boards established under the Act shall award certificates and diplomas for Business, Technical or Vocational education and training under the UVQF;
- (2) The Certificates and Diplomas to be awarded shall be in the form prescribed by the Minister on the recommendation of the Industrial Training Council;
- (3) The Certificates and Diplomas awarded under the Act shall be recognized in the Uganda education system and by the labour market.

Under the TVET Implementation Standards 2020, the proposed new mandate of the Directorate of Industrial Training shall be restricted to promoting the highest standards in the quality and efficiency of industrial training in the country and ensuring an adequate supply of properly trained manpower at all levels in the industry and the world of work.

The functions shall include:

- a) Regulating Industrial training and trainers,
- b) Developing industrial training curricula,
- c) Harmonizing curricula and certificates of competence,
- d) Assessing industrial training,
- e) Development of occupational standards and Assessment and Training Packages (ATPs) for Trade Testing for the industry and world of work and
- f) Awarding certificates in that respect.

At operational level in the Directorate, the Qualification Standards Department performs development tasks related to concepts, procedures and instruments for establishment of the UVQF in close collaboration with both public and private stakeholders in vocational training.

In particular, the Department organizes and coordinates the development of Assessment and Training Packages for use in competence-based vocational training as well as standards-based assessment and certification.

The Directorate has therefore produced this Assessment and Training Package for use in implementing Competence-Based Education and Training mechanisms.

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### **Word from Permanent Secretary**

The Ministry of Education and Sports (MoES) through the Directorate of Industrial Training conducts Competence Based Assessment.

The foreseen advantages of CBA include improved access, equity and relevance of skills development, reduced unit costs of training, and recognition of Prior Learning (or on-the-job- training), among others.

As the Ministry executes its obligation of ensuring quality in training standards, the public-private partnership is being strengthened to improve occupational competence of the country's workforce without gender bias.

To achieve the set-out targets, the Directorate embarked on the anticipated UVQF design and development piloting its instruments and mechanisms in order to effectively enhance Competence-Based Assessment (CBA) in Uganda.

To date, the Qualifications Standards Department of DIT has produced Assessment and Training Packages (ATP) for various occupations. Each ATP contains 3 parts namely:

- 1.Occupational/job Profile
- 2.Training modules and
- 3.Assessment instruments Banks

The ATP can be used by any training provider and/or those who wish to present themselves for Occupational Assessment and Certification.

Herewith, the Directorate of Industrial Training presents the "Assessment & Training Package (ATP)" for training, assessment and certification of **NETWORK ADMINISTRATOR – QUALIFICATION LEVEL 1**.

Finally, I thank all individuals, organizations and development partners who have contributed and/or participated in the review of this noble document.

**Ketty Lamaro**

**Permanent Secretary**

## Executive Summary

This Assessment and Training Package is a Competence-Based Education and Training (CBET) tool and consists of three major parts:

- 0.1 **PART I: The “Occupational Profile” (OP) of a NETWORK ADMINISTRATOR.** This Occupational Profile which was reviewed by Network administrators practicing in the world of work, mirrors the duties and tasks Network administrators are expected to perform in the world of work.
- 0.2 **PART II: “Training Modules”** in the form of guidelines to train **Network administrators** both on the job as well as in training centers (or combinations of both venues of learning). The Training Modules herein have been reviewed basing on the Occupational Profile and hence are directly relevant for employment.
- 0.3 **PART III: “Assessment Instruments”** in the form of performance (Practical) and written (theory) test items that can and should be used to assess whether a person complies with the requirements of employment as a **Network administrator**. These assessment instruments were developed jointly by job practitioners (Network administrator) and teachers based on the occupational profile and training modules<sup>1</sup>.
- 0.4 While the Occupational Profile (OP) contained in PART I of this document provides the information on **WHAT a person is expected to do** competently in the world of work, the test items, -including performance criteria- of PART III qualify the **HOW and/or HOW WELL a person must do the job.**

In combination, both parts -the OP and the test items- constitute the relevant ‘Assessment STANDARDS’ for competence-based assessment and certification for acquiring a credible Qualification for – Network administrator Qualification Level 1.

- 0.5 The modular format of the curriculum (PART II) allows learners to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration of time allowing flexibility for learners to move directly into an entry level job, go for further modules or advance to higher

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<sup>1</sup>In this document, only sample test items for assessing (practical) performance and occupational knowledge (theory) are included. A larger selection of test items can be obtained from an electronic Test Item Bank at Directorate of Industrial Training



levels of training. Modular courses allow more learners to access the training system because training centers as well as companies can accommodate more students in a given period of time.

0.6 In addition to improved access, equity and relevance of BTVET, the UVQF will also enable people who are convinced to have acquired competencies laid down in this ATP through prior training and on-the-job experience to access assessment and certification directly; be it on the basis of a single module, a group of modules or all modules pertaining to the occupation at once. This achievement will facilitate Recognition of Prior Learning (RPL).

0.7 The parts of this Assessment and Training Package were sequentially reviewed as follows:

- i Part 1: Occupational Profile: **January 2022**
- ii Part 2: Training Modules: **January 2022**
- iii Part 3: Assessment Instruments (initial bank): **January 2022**

This ATP (or parts of it) may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

**Patrick Byakatonda**

**Ag Director**

## **Acknowledgement**

The Qualifications Standards Department of DIT wishes to sincerely acknowledge the valuable contributions to the review of this Assessment and Training Package by the following persons, Institutions and organizations:

- Members of the DIT Industrial Training Council;
- The Director and staff of DIT,
- Ministry of Education and Sports;
- The practitioners from the world of work;
- Teachers of ICT in various Secondary schools;
- ICT Curriculum Specialists from NCDC;
- Examination Specialist from UNEB;
- The facilitators involved in guiding the practitioners in their activities;
- The Government of Uganda for financing the review of this ATP;

## Abbreviations and Acronyms

A&C	Assessment & Certification
ATP	Assessment & Training Packages
BTJET	Business, Technical and Vocational Education and Training
CBET	Competency Based Education and Training
DIT	Directorate of Industrial Training
ITC	Industrial Training Council
GoU	Government of Uganda
LWA	Learning-working Assignment
MC	Modular Curriculum
MoES	Ministry of Education and Sports
OP	Occupational Profile
PEX	Practical Exercise
PTI	Performance (Practical) Test Item
QS	Qualification Standards
RPL	Recognition of Prior Learning
TIB	Test Item Bank
TVET	Technical, Vocational, Education and Training
UVQ	Uganda Vocational Qualification
UVQF	Uganda Vocational Qualifications Framework
WTI	Written (Theory) Test Item

## Key Definitions

<b>Assessment</b>	Assessment is the means by which evidence is gathered and judged to decide if an individual has met the stipulated assessment standards or not. Testing is a form of formal assessment.
<b>Certification</b>	Certification is a formal procedure to issue a certificate (qualification) to an individual that has demonstrated during formal assessment that he/she is competent to perform the tasks specified in the occupational profile.
<b>Competence</b>	Integration of skills, knowledge, attitudes, attributes and expertise in doing /performing tasks in the world of work to a set standard.
<b>Competency</b>	(Occupational) competency is understood as the ability to perform tasks common to an occupation to a set standard.
<b>CBET</b>	Competence-based education and training means that programmes: <ol style="list-style-type: none"><li>1. have content directly related to work</li><li>2. focus is on 'doing something well'</li><li>3. assessment is based upon industry work standards, and</li><li>4. curricula are developed in modular form</li></ol>
<b>Duty</b>	A Duty describes a large area of work in performance terms. A duty serves as a title for a cluster of related Tasks (see also: TASK).
<b>Learning-Working Assignment (LWA)</b>	LWA are simulated or real job situations / assignments that are suitable for learning in a training environment (e.g. "small projects"). In a working environment LWAs are real work situations /assignments.
<b>Modules</b>	Modules are part(s) of a curriculum. Modules can be considered as "self-contained" partial qualifications which are described by learning outcomes or competencies and which can be assessed and certified individually.

**Occupational Profile (OP)** An Occupational Profile is an overview of the duties and tasks a job incumbent is expected to perform competently in employment.

Occupational Profiles developed by practitioners from the world of work enhance the relevance of training and learning to the requirements of the world of work.

Occupational Profiles define WHAT a person is supposed to do in performance terms. It also contains generic information regarding related knowledge and skills, attitudes/behavior, tools, materials and equipment required to perform as well as trends/ concerns in the occupation.

Occupational profiles are the reference points for developing modular curricular and assessment standards

**Qualification** A qualification is a formal recognition for demonstrating competence, based on formal assessment against set standards. A qualification is provided to the individual in form of a certificate specifying the nature of the competence.

**Task** Job Tasks represent the smallest unit of job activities with a meaningful outcome. Tasks result in a product, service, or decision. They represent an assignable unit of work and have a definite beginning and ending point. Tasks can be observed and measured.  
(see also: *Duty*)

## 1.0 ATP-PART I

### Occupational Profile for a NETWORK ADMINISTRATOR

- 1.1 The OCCUPATIONAL PROFILE (OP) for “Network administrator” below defines the **Duties** and **Tasks** a competent Network administrator is expected to perform in the world of work (on the job) in Uganda and the East African region today.
- 1.2 Since it reflects the skill requirements of work life, the Occupational Profile is the reference document for the subsequent development of training modules and assessment instruments (test items) which are directly relevant to employment in Ugandan and the East African businesses and industries.
- 1.3 To ensure that the Occupational Profile is relevant for employment in Uganda and East Africa, the DIT used the method of “occupational/job profiling.”<sup>1</sup>

This approach involves the brainstorming of a panel of 8 to 12 competent job practitioners guided by trained and experienced facilitators. During a two-day workshop the panelists define the duties and tasks performed in employment, as well as the prerequisite skills, knowledge, attitudes, tools and equipment, and the future trends and concerns in the occupation/job.

- 1.4 The panelists, facilitators and coordinators who participated in reviewing this Occupational Profile for a NETWORK ADMINISTRATOR are listed on the following page.

**Job Expert Panel**

**Ddungu Abdul**  
MoES

**Nsubuga Hood**  
NCDC

**Abigaba Paul**  
UNEB

**Mbatudde Judith**  
Makerere college school

**Kakaire Charles**  
Busoga College Mwiri

**Mubangizi Justus**  
Ntare school- Mbarara

**Laker Monica**  
St.Joseph's Layibi

**Natukwatsa Molly**  
Mary Hill High School-Mbarara

**Kato Ronald**  
NITA-U

**Atuhwere Arthur**  
Airtel Uganda

**Barisigara Moses**  
HESFB

**Co-ordinator**  
**Mukyala E. Ruth**  
Directorate of Industrial Training

**Facilitators**  
**Asimwe Maureen**  
Directorate of Industrial Training

**Katarihera John Kenedy**  
Directorate of Industrial Training

**Funded by**  
The Government of Uganda



**THE REPUBLIC OF UGANDA**  
**Ministry of Education and Sports**

**Business, Technical and Vocational**  
**Education and Training (BTVET) Sub sector**  
**Reform**

**Occupational Profile**

**For a**

**“ NETWORK ADMINISTRATOR**

**Developed by: Qualifications Standards**  
**Department of the Directorate**  
**of Industrial Training**

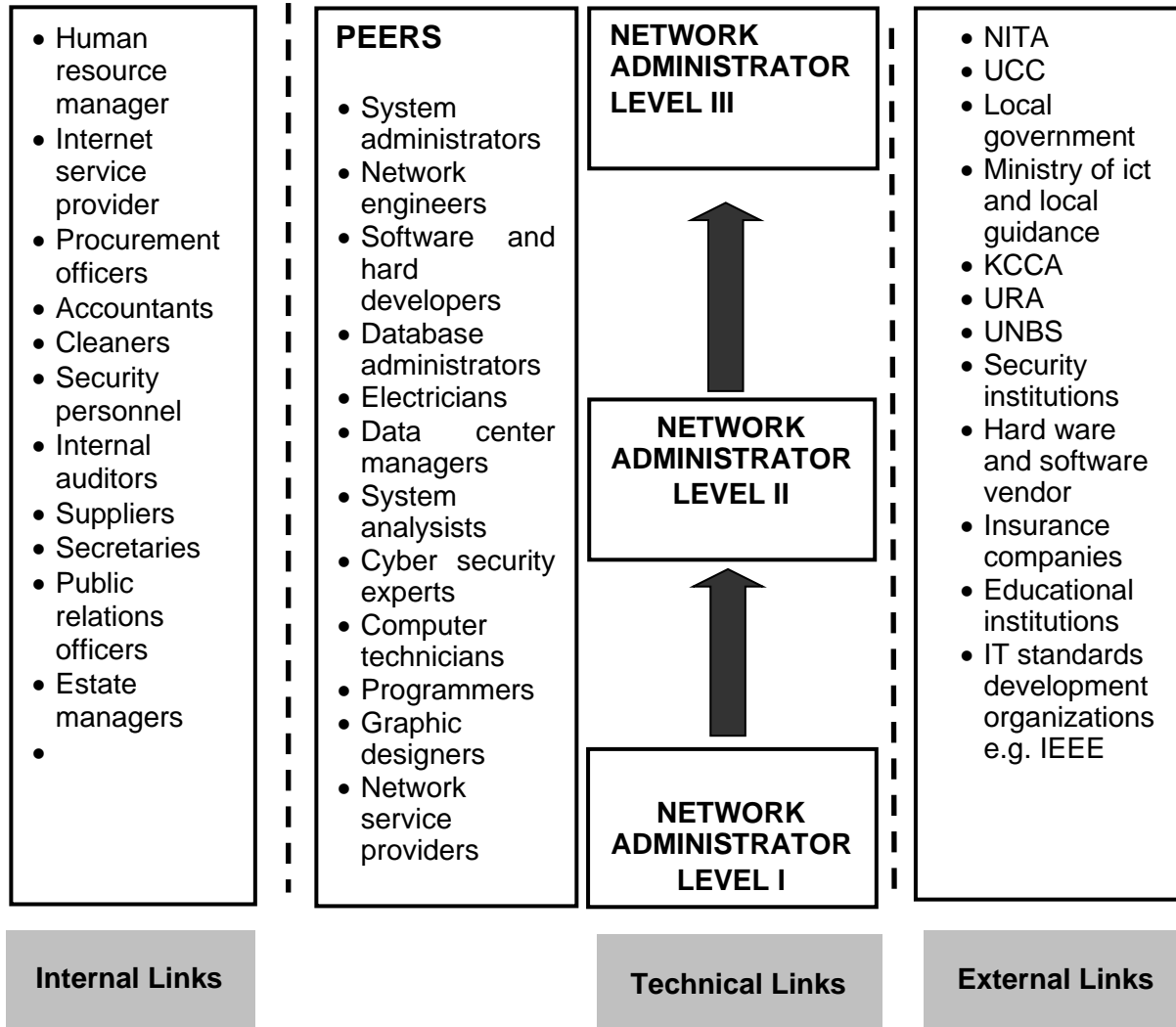
**Date of workshop: 17<sup>th</sup> -21<sup>st</sup> January 2022**

<sup>1</sup> The DACUM-method was used. DACUM is an acronym for 'Develop A Curriculum'

**NOMENCLATURE. Network Administrator**

**Definition**

A network administrator is a person who is responsible for the installation, configuration management and maintenance, of an organization's networks.





**1. A NETWORK ADMINISTRATOR (Level I):**

A person who is able to design, troubleshoot, check logs, audit processes and set up a local area network.

**2. A NETWORK ADMINISTRATOR (level II):**

A person who is able to plan and design the network topologies, manage physical and cloud network and implement network security,

**3. A NETWORK ADMINISTRATOR (level III):**

A person who is able to optimize network performance, document the network and perform managerial tasks.

<b>A. PLAN NETWORK</b>	<b>A1.</b> Carryout feasibility study	<b>A2.</b> Draw operational work plan	<b>A3.</b> Determine resources
	<b>A4.</b> Prepare budget	<b>A5.</b> Design network layout	<b>A6.</b> Determine nature of technology
	<b>A7.</b> Develop terms of reference		

<b>B. IMPLEMENT NETWORK</b>	<b>B1.</b> Set up work area	<b>B2.</b> Lay cables	<b>B3.</b> Terminate cables
	<b>B4.</b> Install power backups	<b>B5.</b> Install device operating systems	<b>B6.</b> Configure network devices
	<b>B7.</b> Test connectivity	<b>B8.</b> Secure network	<b>B9.</b> Document connectivity and network lay out

<b>C. MANAGE SERVER AND OPERATING SYSTEM</b>	<b>C1.</b> Update software	<b>C2.</b> Upgrade hardware	<b>C3.</b> Mitigate network risks
	<b>C4.</b> Update configuration	<b>C5.</b> Balance network load and traffic.	<b>C6.</b> Trouble shoot network
	<b>C7.</b> Generate report		

<b>D. MANAGE NETWORK BACKUPS</b>	<b>D1.</b> Organize data	<b>D2.</b> Select network backup methods	<b>D3.</b> Select network backup tools
	<b>D4.</b> Perform network configuration back up	<b>D5.</b> Secure back up data	<b>D6.</b> Perform routine backup tests
	<b>D7.</b> Restore network configurations		

<b>E. CARRYOUT NETWORK DOCUMENTATION</b>	<b>E1.</b> Create documentation policy	<b>E2.</b> Document network topology map	<b>E3.</b> Document network road map
	<b>E4.</b> Document network configuration details	<b>E5.</b> Record network inventory	<b>E6.</b> Document backups
	<b>E7.</b> Monitor documentation		

<b>F. PERFORM OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION</b>	<b>F1.</b> Manage wastes	<b>F2.</b> Comply with personal health and safety regulations	<b>F3.</b> Display safety signs
	<b>F4.</b> Interpret user manuals	<b>F5.</b> Administer first aid	<b>F6.</b> Sensitize workers on communicable and non-communicable diseases
	<b>F7.</b> Assess structured cables	<b>F8.</b> Use PPE	<b>F9.</b> Perform fire fighting

<b>G. PERFORM ADMINISTRATIVE TASKS</b>	<b>G1.</b> Develop network administration guidelines	<b>G2.</b> Develop strategic plan	<b>G3.</b> Comply with policies and regulations
	<b>G4.</b> Manage finances	<b>G5.</b> Procure supplies	<b>G6.</b> Conduct meetings
	<b>G7.</b> Pay workers	<b>G8.</b> Appraise workers	

<b>H. PURSUE CONTINUOUS PROFESSIONAL DEVELOPMENT</b>	<b>H1.</b> Attend workshops	<b>H2.</b> Attend seminars	<b>H3.</b> Register with professional bodies
	<b>H4.</b> Pursue further studies	<b>H5.</b> Attend trainings	<b>H6.</b> Create associations

<b>I. PERFORM ENTREPRENEURIAL SKILLS</b>	<b>I1.</b> Secure business location premises	<b>I2.</b> Legalize business	<b>I3.</b> Brand company
	<b>I4.</b> Price network services	<b>I5.</b> Advertise products and services	<b>I6.</b> Perform customer care
	<b>I7.</b> Create partnership		

## Additional Information

### Related Knowledge & Skills

#### 1. Programming

- Different programming languages e.g. python, C++, JAVA, SQL
- Programming concepts that is Structured, functional and Object-Oriented Programming
- Different IDEs (Integrated Development Environment)
- Dependencies (Libraries, Modules, packages etc.)

#### 2. Electrical

- Electrical installation machines
- instrumentation

#### 3. Electronics

- Circuit design
- Component sizing
- Embedded systems
- Embedded software
- Electronic development tools
- Analog and digital principles
- Simulation
- soldering
- Sensor technology

#### 4. Computer networking

#### 5. System analysis and design

#### 6. data analysis

#### 7. Machine learning and Artificial Intelligence

#### 8. Network security

#### 9. Cloud computing

#### 10. User interface design

#### 11. Laws and policies

#### 12. Co-ordination skills

#### 13. Interpersonal skills

#### 14. critical thinking and problem solving

#### 15. Communication and collaboration skills

#### 16. Ability to multi-task

#### 17. Research skills

#### 18. Time management

#### 19. Numeracy skills

#### 20. negotiation skills

#### 21. Business planning and management

#### 22. Related software and hardware usage

#### 23. Mechanical (fabrication, design)

#### 24. Basic physics and mathematics

#### 25. Computer Aided Designs (electrical, mechanical, 3D, PCB modelling and mechanical simulation)

**Tools, Equipment and Material**

1. Computers
2. Software
3. Extract cables
4. Cameras
5. Portable storage media
6. Ethernet cables
7. Electricity
8. Hammer
9. Blower
10. RJ-45 connectors
11. Crimping tool
12. Screw driver
13. Slicer
14. splicer
15. Air conditioner
16. Fire extinguishers
17. Testers
18. SFP (small form factor pluggable)
19. Microwaves
20. Pliers
21. Anti-static wrist strap
22. Micro fibre cloth
23. Anti-static mat
24. Soft brushes
25. Hub
26. Switch
27. Router
28. Bridge
29. Gateway
30. Modem
31. Repeater
32. Access Point
33. Multi meter
34. Network cable tester
35. Uninterruptible Power Supply(UPS)
36. Extension cables
37. Spectrum analyser
38. Tape measure
39. soldering gun
40. solder wire
41. soldering sucker
42. Driller
43. Tweezers
44. Oscilloscope

<b>Attitudes/Traits/Behavior</b>	<b>Future trends and Concerns</b>
<ol style="list-style-type: none"> <li>1. Team player</li> <li>2. up-to-date</li> <li>3. result oriented</li> <li>4. Integrity</li> <li>5. Flexibility</li> <li>6. Enthusiastic</li> <li>7. Open minded</li> <li>8. Honest</li> <li>9. Trust worthy</li> <li>10. Creative and innovative</li> <li>11. Dependable</li> <li>12. Intelligent</li> <li>13. Quick learner</li> <li>14. Analytical</li> <li>15. Humorous</li> <li>16. Humility</li> <li>17. Resilient</li> <li>18. Stress management</li> <li>19. Self-evaluation</li> <li>20. Confident</li> <li>21. considerate</li> <li>22. Organized</li> <li>23. Listener</li> <li>24. Accurate</li> <li>25. Critical</li> <li>26. Clean</li> <li>27. Efficient</li> <li>28. punctual</li> </ol>	<ol style="list-style-type: none"> <li>1. Big data management</li> <li>2. Dynamics in Cloud computing</li> <li>3. User experience design</li> <li>4. Advancements in Artificial Intelligence</li> <li>5. API integration vulnerabilities and its impact on economies</li> <li>6. Emergency of Block chain technology</li> <li>7. Advancements in Quantum computing</li> <li>8. Information and network Security</li> <li>9. Networks evolution and Convergence</li> <li>10. Virtual and augmented reality (near to perfect experience)</li> <li>11. Natural language processing gap</li> <li>12. Hardware and software advancement</li> <li>13. Management of Autonomous network</li> <li>14. Need for Network administration Standards</li> <li>15. Need for professional body</li> <li>16. ubiquitous computing</li> <li>17. Open source development</li> <li>18. Ergonomics</li> <li>19. Green computing</li> </ol>



<p>29. Hardworking 30. Reasonable 31. tolerant 32. Approachable 33. Good communicator 34. Teachable</p>	<p>20. Network virtualization 21. Wearable gadgets 22. Progressing Applications 23. Limited and unreliable power supply 24. IoT 25. Automation and robotics 26. Protocol and standards</p>
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## 2.0 ATP – PART II

### Training Modules for NETWORK ADMINISTRATOR

- 2.1 A curriculum is a “guide /plan for teaching and learning” which provides a guide to teachers, instructors and learners. In the envisaged system of competence-based or outcome-oriented education and training (CBET), Curricula are no longer the benchmark against which assessment is conducted. It is rather the Occupational Profile that provides the benchmark for Curriculum development as well as assessment.
- 2.2 This modular format of the curriculum allows learners of Network administrator to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration of time allowing learners to move directly into an entry level job, do further modules and advance to higher levels of training. Modular courses allow more learners to access the training system because training centers, as well as companies can accommodate more students in a given period of time.
- 2.3 The modules were developed jointly by both instructors and job practitioners. They were developed using the Occupational Profile as a reference point and taking into account the specifications of training and learning outcomes.
- 2.4 The modules contain “Learning-Working Assignments” (LWAs) and related “Practical Exercises” (PEXs) as key elements.
- LWAs are simulated or real job situations/assignments that are suitable for learning in a training environment (e.g. “small projects”). In a working environment, LWAs are real work situations.
- PEXs are therefore sub-sets of a LWA.
- 2.5 In principle, and following the philosophy of Competence-Based Education and Training (CBET), the modules can be used as a guide for learning in a training Centre, at the workplace; or a combination of both.

## WHO IS A NETWORK ADMINISTRATOR LEVEL 1

A **NETWORK ADMINISTRATOR LEVEL 1**: is a person who is able to design, troubleshoot, check logs, audit processes and set up a local area network.

## OVERVIEW OF MODULES FOR A NETWORK ADMINISTRATOR UVQ LEVEL 1

code	Module title	Average duration	
		Contact hours	weeks
UE/NA/M1.1	Set up LAN network	240	6
UE/NA/M1.2	Manage network	200	5
UE/NA/M1.2	Maintain network	120	3
UE/NA/M1.4	Establish consultancy enterprises	120	3
<b>summary</b>	<b>5 Modules</b>	<b>760</b>	<b>19</b>

**Note: Average duration is contact time but NOT calendar duration**

It is assumed that:

- 1 day is equivalent to 8 hours of nominal learning and
- 1 month is equivalent to 160hours of nominal learning

Information given on the average duration of training should be understood as a guideline. Quick learners may need less time than indicated or vice versa.

At completion of a module, the learner should be able to satisfactorily perform the included Learning Working Assignments, their Practical exercises and attached theoretical instructions, as the minimum exposure.

Prior to summative assessment by recognized Agencies, the users of these Modules Guides are encouraged to carefully consider continuous assessment using samples of (or similar) performance (practical) and written test items available in part 3 of this ATP for **network administrator**.

## TRAINING MODULES FOR A NETWORK ADMINISTRATOR

<b>code</b>	<b>UE/NA/M1.1</b>
<b>Module title</b>	<b>M1.1: Set up LAN network</b>
<b>Related qualifications</b>	<u>Part of</u> Uganda Vocational Qualification (Network administrator UVQ 1)
<b>Qualification level</b>	<b>1</b>
<b>Module purpose</b>	After completion of this module, a trainee will be able to setup LAN network
<b>Learning-working assignments(LWAs)</b>	<p><b>LWA 1/1 : Conduct site survey</b></p> <p><b>LWA 1/2 : Design network topology</b></p> <p><b>LWA 1/3 : Assemble tools and software</b></p> <p><b>LWA 1/4 : Implement network topology</b></p> <p><b>LWA 1/5 : Perform occupational health, safety and environmental protection practices</b></p> <p><b><u>Note:</u></b></p> <ol style="list-style-type: none"> <li><i>The learning exercises may be repeated till the Trainee acquires targeted competence;</i></li> <li><i>The Trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i></li> </ol>
<b>Related practical exercise (PEXs)</b>	<p><b>LWA 1/1: Conduct site survey</b></p> <p>PEX 1.1 : Schedule appointment</p> <p>PEX 1.2 : Gather tools</p> <p>PEX 1.3 : Collect network requirements</p> <p>PEX 1.4 : Generate site survey report</p>

	<p><b>LWA 1/2: Design network topology</b></p> <p>PEX 2.1 : Assemble simulation tools</p> <p>PEX 2.2 : Map users and network devices</p> <p>PEX 2.3 : Draw network layout</p>
	<p><b>LWA 1/3: Implement network topology</b></p> <p>PEX 2.1 : Install network devices</p> <p>PEX 2.2 : Terminate network cables</p> <p>PEX 2.3 : Trunk network cables</p> <p>PEX 2.4 : Configure devices</p> <p>PEX 2.5 : Test network connectivity</p>
	<p><b>LWA1/4: Perform Occupational Health, Safety and Environmental protection practices</b></p> <p>PEX 3.1 : Wear protective gear</p> <p>PEX 3.2 : Observe safety signs</p> <p>PEX 3.3 : Manage wastes</p> <p>PEX 3.4 : Observe power load balancing</p> <p>PEX 3.5 : Administer first aid</p> <p>PEX 3.6 : Perform fire fighting</p> <p>PEX 3.7 : Interpreted device manuals</p> <p>PEX 3.8 : Perform water and moisture proofing</p> <p>PEX 3.9 : Observe personal and environmental hygiene</p> <p>PEX 3.10 : Perform dust proofing</p>
<b>Occupational health and safety</b>	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
<b>Pre-requisite modules</b>	None

<b>Related knowledge/ theory</b>	<p><i>For Occupational theory suggested for instruction/ demonstration, the Trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> <li>• Network devices usage</li> <li>• Tools and equipment knowledge</li> <li>• Occupational health and safety practices</li> <li>• Effects of oxidation on networks equipment</li> <li>• Short circuit</li> <li>• Computer literacy</li> <li>• Numeracy</li> <li>• Graphics and design</li> <li>• Research skills</li> <li>• Report writing</li> <li>• Data analysis skills</li> </ul>
<b>Average duration of learning</b>	<p>120 hours (15 days) of nominal learning suggested to include:</p> <p><i>5 days of occupational theory and 10 days of occupational practice</i></p>
<b>Suggestion on organization of learning</b>	<p>The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.</p>
<b>Assessment</b>	<p>Assessment to be conducted according to established regulations by recognized assessment body using related Practical and Written Test Items from Item Bank</p>
<b>Minimum required tools/equipment/implements or equivalent</b>	<p>Air conditioner, Server racks/server covers, UPS (UN interruptible power supply), external discs, fire extinguisher, computers, phones, PPE, power cables, Ethernet cables, Fiber optic cables, blowers, routers and switches</p>

<b>Minimum required materials and consumables</b>	Cables, foam cleaners, detergents, RJ45, cable ties, cable trunks, screws, wall plugs, conduits, stationery
<b>Special notes</b>	The theory must be integrated into the practice during training.

<b>Code</b>	<b>UE/NA/M1.3</b>
<b>Module title</b>	<b>M1.3: Manage Network</b>
<b>Related qualification</b>	<u>Part of</u> Uganda Vocational Qualification (Network administrator UVQ 1)
<b>Qualification level</b>	<b>1</b>
<b>Module purpose</b>	A trainee should be able to manage network, install and run a network server
<b>Learning-working assignments (LWAs)</b>	<p><b>LWA 3/1 : Manage Users</b></p> <p><b>LWA 3/2 : Manage network devices</b></p> <p><b>LWA 3/3 : Perform end user support</b></p> <p><b>LWA 3/4 : Manage backups</b></p> <p><b>LWA 3/5 : Perform network security</b></p> <p><b>LWA 3/6 : Monitor performance</b></p> <p><b>LWA 3/7 : Perform occupational health, safety and environmental protection practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>The learning exercises may be repeated till the Trainee acquires targeted competence;</i></li> <li><i>The Trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i></li> </ol>
<b>Related practical exercise (PEXs)</b>	<p><b>LWA 3/1 : Manage User</b></p> <p>PEX 3.1 : Add users</p> <p>PEX 3.2 : Remove users</p> <p>PEX 3.3 : Assign user rights</p> <hr/> <p><b>LWA 3/2 : Manage network devices</b></p> <p>PEX 2.1 : Assign IP addresses</p> <p>PEX 2.2 : Configure devices</p> <p>PEX 2.3 : Test hardware performance</p>



	<p>PEX 2.4</p>
	<p><b>LWA 3/3 : Perform end user support</b></p> <p>PEX 3.1 : Interpret user manual</p> <p>PEX 3.2 : Train users</p> <p>PEX 3.3 : Resolve end user issues</p> <p>PEX 3.4 : Document user issues</p>
	<p><b>LWA 3/4 : Manage backups</b></p> <p>PEX 4.1 : Organize data</p> <p>PEX 4.2 : Implement backup</p> <p>PEX 4.3 : Recover backup</p>
	<p><b>LWA 3/5 Perform network security</b></p> <p>PEX 5.1: Manage security</p> <p>PEX 5.2: Cadge devices</p> <p>PEX 5.3: Install firewall</p>
	<p><b>LWA 3/6 Monitor performance</b></p> <p><b>PEX 6.1: Monitor network bandwidth</b></p> <p><b>PEX 6.2: Monitor data usage</b></p>
	<p><b>LWA 3/7 : Perform Occupational Health, Safety and Environmental protection practices</b></p> <p>PEX 5.1 : Wear protective gear</p> <p>PEX 5.2 : Observe safety signs</p> <p>PEX 5.3 : Manage wastes</p> <p>PEX 5.4 : Observe power load balancing</p> <p>PEX 5.5 : Administer first aid</p> <p>PEX 5.6 : Perform fire fighting</p> <p>PEX 5.7 : Interpreted device manuals</p> <p>PEX 5.8 : Perform water and moisture proofing</p> <p>PEX 5.9 : Observe personal and environmental hygiene</p> <p>PEX 5.10 : Perform dust proofing</p>

<b>Occupational health and safety</b>	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
<b>Pre-requisite modules</b>	
<b>Related knowledge/skills</b>	<p><i>For Occupational theory suggested for instruction/ demonstration, the Trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> <li>• First aid administration</li> <li>• Green computing</li> <li>• Operating systems architectures</li> <li>• Cyber security</li> <li>• Band width and traffic management</li> <li>• Software installation</li> </ul>
<b>Average duration of learning</b>	<p>200 hours ( 25 days) of nominal learning suggested to include:</p> <p><i>10 days of occupational theory and 15 days of occupational practice</i></p>
<b>Suggestion on organization of learning</b>	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.
<b>Assessment</b>	Assessment to be conducted according to established regulations by recognized assessment body using related Practical and Written Test Items from Item Bank
<b>Assessment</b>	Assessment to be conducted according to established regulations by recognized assessment body using related Practical and Written Test Items from Item Bank

<b>Minimum required tools/equipment/implements or equivalent</b>	Cloud computing, Air conditioner, Server racks/server covers, UPS (UN interruptible power supply), External discs, Fire extinguisher, Computers, Phones, PPE, Power cables, Ethernet cables, Fiber optic cables, Blowers, Routers and switches.
<b>Minimum required materials and consumables</b>	Cables, foam cleaners, detergents, RJ45, cable ties, cable trunks, screws, wall plugs, conduits,
<b>Special note</b>	The theory must be integrated into the practice during training.

<b>Code</b>	<b>UE/NA/M1.2</b>
<b>Module title</b>	<b>M1.4: Maintain Network</b>
<b>Related qualification</b>	<u>Part of</u> Uganda Vocational Qualification (Network administrator UVQ 1)
<b>Qualification level</b>	<b>1</b>
<b>Module purpose</b>	After completion of this module, a trainee will be able to maintain network
<b>Learning-working assignments (LWAs)</b>	<p><b>LWA 4/1 : Perform network troubleshooting</b></p> <p><b>LWA 4/2 : Service network</b></p> <p><b>LWA 4/3 : Perform Occupational Health, Safety and Environmental protection practices</b></p> <p><b><u>Note:</u></b></p> <ol style="list-style-type: none"> <li>1. <i>The learning exercises may be repeated till the</i></li> <li>2. <i>Trainee acquires targeted competence;</i> <i>The Trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i></li> <li>3. <i>Order of execution may vary.</i></li> </ol>

<p><b>Related practical exercise (PEXs)</b></p>	<p><b>LWA 4/1 : Perform network troubleshooting</b>                  PEX 1.1 : Perform Configurations                  PEX 1.2 : Check connectivity                  PEX 1.3 : Monitor network                  PEX 1.4 : Restore connectivity</p> <hr/> <p><b>LWA 4/2 : Service network</b>                  PEX 2.1 : Perform routine checks                  PEX 2.2 : Identify serviceable devices                  PEX 2.3 : Upgrade network devices                  PEX 2.4 : Update software                  PEX 2.5 : Update records</p> <hr/> <p><b>LWA 4/3 : Perform Occupational Health, Safety and Environmental protection practices</b>                  PEX 3.1 : Observe safety signs                  PEX 3.2 : Manage wastes                  PEX 3.3 : Observe power load balancing                  PEX 3.4 : Administer first aid                  PEX 3.5 : Perform fire fighting                  PEX 3.6 : Interpreted device manuals                  PEX 3.7 : Perform water and moisture proofing                  PEX 3.8 Observe personal and environmental Hygiene</p>
<p><b>Occupational health and safety</b></p>	<p>Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs</p>
<p><b>Pre-requisite modules</b></p>	<p>None</p>
<p><b>Related knowledge/theory</b></p>	<p><i>For Occupational theory suggested for instruction/ demonstration, the Trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p>

	<ul style="list-style-type: none"> <li>• Network devices usage</li> <li>• Tools and equipment knowledge</li> <li>• Occupational health and safety practices</li> <li>• Effects of oxidation on networks equipment</li> <li>• Short circuit</li> <li>• Computer literacy</li> <li>• Numeracy</li> <li>• Graphics and design</li> <li>• Research skills</li> <li>• Report writing</li> <li>• Data analysis skills</li> </ul>
<b>Average duration of learning</b>	<p>120 hours (15 days) of nominal learning suggested to include:</p> <p><i>5days of occupational theory and 10 days of occupational practice</i></p>
<b>Suggestion on organization of learning</b>	<p>The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.</p>
<b>Assessment</b>	<p>Assessment to be conducted according to established regulations by recognized assessment body using related Practical and Written Test Items from Item Bank</p>
<b>Minimum required tools/equipment/implements or equivalent</b>	<p>Cutters, Scissors, Pliers, Splicers, Crippling tools, Cable testers, Cyber optic tools, Screw drivers, strippers, first aid kit, PPE, Fire extinguisher, Dusters, Air conditioner, Blower, Surface cleaning foam, Padlocks, Brooms, Brushes</p>
<b>Minimum required materials and consumables</b>	<p>Cables, foam cleaners, detergents, RJ45, cable ties, cable trunks, screws, wall plugs, conduits.</p>
<b>Special note</b>	<p>The theory must be integrated into the practice during training.</p>



<b>Code</b>	<b>UE/NA/M1.5</b>
<b>Module title</b>	<b>M5: ESTABLISH CONSULTANCY ENTERPRISES</b>
<b>Related qualification</b>	Part of Uganda Vocational Qualification (Network administrator UVQ 1)
<b>Qualification level</b>	<b>1</b>
<b>Module purpose</b>	Purpose, the trainee should be able to establish a consultancy firm.
<b>Learning-working assignments(LWAs)</b>	<p><b>LWA 5/1 : Plan consultancy enterprise.</b></p> <p><b>LWA 5/2 : Market network consultancy services</b></p> <p><b>LWA 5/3 : Perform administrative tasks</b></p> <p><b>LWA 5/4 : Perform Occupational Health, Safety and Environmental protection practices</b></p> <ol style="list-style-type: none"> <li>1. <i>The learning exercises may be repeated till the Trainee acquires targeted competence;</i></li> <li>2. <i>The Trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i></li> </ol>
<b>Related practical exercise (PEXs)</b>	<p><b>LWA 5/1 : Plan consultancy enterprise.</b></p> <p>PEX 1.1 : Carry out feasibility study</p> <p>PEX 1.2 : Prepare budget</p> <p>PEX 1.3 : Prepare production plan</p> <p>PEX 1.4 : Prepare marketing plan</p> <p>PEX 1.5 : Prepare procurement plan</p> <p>PEX 1.6 : Prepare work schedules</p> <p>PEX 1.7 : Prepare enterprise structural layout</p>



	<p><b>LWA 5/2 : Market network consultancy services</b></p> <p>PEX 2.1 : Promote network consultancy services</p> <p>PEX 2.2 : Brand network consultancy services</p> <p>PEX 2.3 : Price network consultancy services</p> <p>PEX 2.4 : Sell network consultancy services</p> <p>PEX 2.5 : Communicate with clients</p> <hr/> <p><b>LWA 5/3 Perform administrative tasks</b></p> <p>PEX 3.1 : Formalize business</p> <p>PEX 3.2 : Manage finances</p> <p>PEX 3.3 : Acquire equipment, tools and materials</p> <p>PEX 3.4 : Manage human resource</p> <p>PEX 3.5 : Communicate with stakeholders</p> <p>PEX 3.6 : Carryout basic book keeping</p> <hr/> <p><b>LWA 5/4: Perform Occupational Health, Safety and Environmental protection practices</b></p> <p>PEX 4.1 : Wear protective gear</p> <p>PEX 4.2 : Observe safety signs</p> <p>PEX 4.3 : Manage wastes</p> <p>PEX 4.4 : Observe power load balancing</p> <p>PEX 4.5 : Administer first aid</p> <p>PEX 4.6 : Perform fire fighting</p> <p>PEX 4.7 : Interpreted device manuals</p> <p>PEX 4.8 : Perform water and moisture proofing</p> <p>PEX 4.9 : Observe personal and environmental hygiene</p> <p>PEX 4.10 : Perform dust proofing</p>
<b>Occupational health and safety</b>	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
<b>Pre-requisite modules</b>	None

<p><b>Related knowledge/ theory</b></p>	<p><i>For Occupational theory suggested for instruction/ demonstration, the Trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> <li>• marketing skills</li> <li>• Communications and collaboration kills</li> <li>• Analytical</li> <li>• Public relations</li> <li>• First aid administration</li> <li>• Business law</li> <li>• Business registration</li> <li>• Interpersonal</li> <li>• Human resource management</li> <li>• Financial management</li> <li>• Resource mobilization</li> <li>• Professional ethics</li> <li>• Cyber security basics</li> <li>• Emerging technologies and trends</li> <li>• Green computing</li> <li>• Waste management</li> <li>• Data management</li> <li>• EHS, environmental health safeguards</li> <li>• Gender based violence</li> </ul>
<p><b>Average duration of learning</b></p>	<p>120 hours (15 days) of nominal learning suggested to include:</p> <p><i>5 days of occupational theory and 10 days of occupational practice</i></p>

<b>Suggestion on organization of learning</b>	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.
<b>Assessment</b>	Assessment to be conducted according to established regulations by recognized assessment body using related Practical and Written Test Items from Item Bank
<b>Minimum required tools/equipment/implements or equivalent</b>	First aid kit, printer, scanner computer, communication gadgets, calculator, camera, capital, furniture, personal protective equipment  transport means, utilities, security devices,
<b>Minimum required materials and consumables</b>	Brochures, Receipt, Stationary, Data/Internet, detergents,
<b>Special notes</b>	The theory must be integrated into the practice during training.

### 3.0 ATP- PART III

#### Assessment Instruments for NETWORK ADMINISTRATOR

- 3.1 **Assessment** of occupational competence is the procedure by which evidence is gathered and judged to decide if an individual (candidate) has met the stipulated assessment standards.
- 3.2 Assessment of occupational competence should comprise of both practical (performance) testing and written (theory/knowledge) testing.
- 3.3 Based on the Occupational Profile and Training Modules, a combined panel of job practitioners and Instructors developed a substantial number of test items for assessing (practical) performance as well as items for assessing occupational knowledge (theory) all stored in an electronic Test Item Bank (TIB) at the Directorate of Industrial Training.
- 3.4 Performance (Practical) Test Items (PTI) are closely related to typical work situations in Ugandan business enterprises. They comprise of a test assignment for candidates and assessment criteria and/or scoring guides for assessors' use.
- 3.5 Written Test items (WTI) for written testing of occupational theory, (knowledge) are presented in different forms which include:
- Short answer test items.
  - Multiple choice test items
  - Matching test items,
- These WTIs herein focus on functional understanding as well as trouble-shooting typically synonymous with the world of work.
- 3.6 Composition of assessment/test papers will always require good choices of different types of WTI in order to ensure the assessment of relevant occupational knowledge required of candidates to exhibit competence.
- 3.7 The test items contained in the Test Item Bank may be used for continuous/formative assessment during the process of training as well as for

summative assessment of candidates who have acquired their competences non-formally or informally.

- 3.8 In this document, samples of test items for assessing both performance (practical) and occupational knowledge (theory) of a **NETWORK ADMINISTRATOR** are included.

### Overview of Test Item Samples Included

No.	Type of Test Item	Numbers included
1.	Written (Theory)- Short Answer	3
2.	Written (Theory)- Multiple Choice	2
3.	Written (Theory)- Matching with generic	1
4.	Written (Theory)- Matching with work sequence	1
5.	Written (Theory)- Matching with cause and effect	1
6.	Performance (Practical) Test Items	1
	<b>Total</b>	<b>8</b>

### WRITTEN TEST ITEM (SAMPLEL)

Test Item Database																
Written (Theory) Test Item- no. 1																
<b>Occupational Title:</b>	Network administrator															
<b>Competence level:</b>	Level 1															
<b>Code no.</b>																
<b>Test Item type:</b>	<table border="1"> <tr> <td>Short answer</td> <td colspan="3">√</td> </tr> <tr> <td>Multiple choice</td> <td colspan="3"></td> </tr> <tr> <td rowspan="2">Matching item</td> <td>Generic</td> <td>Cause- Effect</td> <td>Work- sequence</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	Short answer	√			Multiple choice				Matching item	Generic	Cause- Effect	Work- sequence			
Short answer	√															
Multiple choice																
Matching item	Generic	Cause- Effect	Work- sequence													
<b>Complexity level:</b>	C2															
<b>Date of OP:</b>	January, 2022															

<b>Related module:</b>	M3
<b>Time allocation:</b>	4 minutes

<b>Test Item</b>	List four (4) factors considered when installing a wireless network design.
<b>Answer spaces</b>	1. .... 2. .... 3. .... 4. ....
<b>Expected key (answers)</b>	1. Authentication 2. Services and applications 3. Encryption 4. Coverage and number of users 5. Device specifications 6. Work area

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 1																		
Occupational Title:	Network administrator																		
Competence level:	Level 1																		
Code no.																			
Test Item type:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Short answer</td> <td colspan="3" style="text-align: center;">√</td> </tr> <tr> <td>Multiple choice</td> <td colspan="3"></td> </tr> <tr> <td rowspan="2">Matching item</td> <td style="width: 20%;">Generic</td> <td style="width: 20%;">Cause- Effect</td> <td style="width: 20%;">Work-sequence</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>				Short answer	√			Multiple choice				Matching item	Generic	Cause- Effect	Work-sequence			
Short answer	√																		
Multiple choice																			
Matching item	Generic	Cause- Effect	Work-sequence																
Complexity level:	C2																		
Date of OP:	January, 2022																		
Related module:	M1.1																		
Time allocation:	4 minutes																		

Test Item	Outline advantages and disadvantages of star topology
Answer spaces	<p>A. ADVANTAGES</p> <p style="margin-left: 40px;">1. ....</p> <p style="margin-left: 40px;">2. ....</p> <p style="margin-left: 40px;">3. ....</p> <p>B. DISADVANTAGES</p> <p style="margin-left: 40px;">1. ....</p> <p style="margin-left: 40px;">2. ....</p> <p style="margin-left: 40px;">3. ....</p>
Expected key (answers)	<p><b>ADVANTAGES</b></p> <p>1. Easy installation</p> <p>2. Minimal configuration</p> <p>3. Easy to troubleshoot.</p> <p>4. Economizes network resources</p>



	<p>5. Simple to implement</p> <p><b>DISADVANTAGES</b></p> <ol style="list-style-type: none"> <li>1. The central device represents a single point of failure.</li> <li>2. Costly</li> <li>3. The capabilities of the central device can limit overall performance for access to the network.</li> <li>4. Prone to security attack</li> </ol>
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 1																		
<b>Occupational Title:</b>	Network administrator																		
<b>Competence level:</b>	Level 1																		
<b>Code no.</b>																			
<b>Test Item type:</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #f4cccc;">Short answer</td> <td colspan="3" style="text-align: center;">√</td> </tr> <tr> <td>Multiple choice</td> <td colspan="3"></td> </tr> <tr> <td rowspan="2">Matching item</td> <td>Generic</td> <td>Cause- Effect</td> <td>Work-sequence</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>				Short answer	√			Multiple choice				Matching item	Generic	Cause- Effect	Work-sequence			
Short answer	√																		
Multiple choice																			
Matching item	Generic	Cause- Effect	Work-sequence																
<b>Complexity level:</b>	C1																		
<b>Date of OP:</b>	January, 2022																		
<b>Related module:</b>	M4																		
<b>Time allocation:</b>	4 minutes																		

<b>Test Item</b>	The use of computer networks can lead to problems of keeping data secure and confidential. Two methods of overcoming this are the use of authentication techniques and data encryption
<b>Answer spaces</b>	A) Give two (2) authentication techniques. 1. .... 2. .... B) Give two (2) features of data encryption 1. .... 2. ....
<b>Expected key (answers)</b>	<b>Authentication techniques</b> 1. Passwords 2. Biometrics 3. Tokens 4. Session management <b>Data encryption</b> 1. Only authorize user/system can interpret the data 2. A key is used to decrypt data 3. Encrypted files are scrambled

DIT/ QS		Test Item Database Written (Theory) Test Item- no. 3			
<b>Occupational Title:</b>	Network administrator				
<b>Competence level:</b>	Level 1				
<b>Code no.</b>					
<b>Test Item type:</b>	Short answer				
	Multiple choice	√			
	Matching item	Generic	Cause- Effect	Work-sequence	
<b>Complexity level:</b>	C2				
<b>Date of OP:</b>	January 2022				
<b>Related module:</b>	M1.4				
<b>Time allocation:</b>	1Minutes				

<b>Test Item</b>	What does point to point protocol (PPP) use to identify the Network layer
<b>Distractors and correct answer</b>	A. NCP B. ISDN C. HDLC D. LCP

<b>Key (answer)</b>	A
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 3			
<b>Occupational Title:</b>	Network administrator			
<b>Competence level:</b>	Level 1			
<b>Code no.</b>				
<b>Test Item type:</b>	Short answer			
	Multiple choice	√		
	Matching item	Generic	Cause- Effect	Work-sequence
<b>Complexity level:</b>	C3			
<b>Date of OP:</b>	January 2022			
<b>Related module:</b>	M1.3			
<b>Time allocation:</b>	2 Minutes			

<b>Test Item</b>	An interface may be shut down administratively to.....?
<b>Distractors and correct answer</b>	A. Replace interface B. Check connectivity C. Avoid network security attack D. Enable interface looping.

<b>Key (answer)</b>	C
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DIT/ QS	Test Item Database Written (Theory) Test Item- no.
<b>Occupational Title:</b>	Network administrator

<b>Competence level:</b>	Level 1			
<b>Code no.</b>				
<b>Test Item type:</b>	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
		√		
<b>Complexity level:</b>	C2			
<b>Date of OP:</b>	January 2022			
<b>Related module:</b>	M1.4			
<b>Time allocation:</b>	4 Minutes			

<b>Test Item</b>	Match the following items to their appropriate uses
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Column A (Item)	
A	IP Address
B	DNS
C	URL
D	Bandwidth
E	ISP
F	WAP

Column B (uses)	
1	A location or address identifying where documents can be found on the network (Web address)
2	A unique string of characters which identifies each node on a network.
3	Translates IP addresses into routing tables.
4	An entity that provides access to the Internet
5	Allows wireless devices to connect to satellites
6	The rate of data transfer on a network
7	Translates IP addresses into domain names.
8	The number of devices on a network

		9	Allows wireless devices to connect to network
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<b>Key (answer)</b>	A-3, B-1, 7-C, F-4, D-9, E-6
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DIT/ QS	Test Item Database Written (Theory) Test Item- no.			
<b>Occupational Title:</b>	Network administrator			
<b>Competence level:</b>	Level 1			
<b>Code no.</b>				
<b>Test Item type:</b>	Short answer			
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work- sequence
				√
<b>Complexity level:</b>	C2			
<b>Date of OP:</b>	January 2022			
<b>Related module:</b>	M1.2			
<b>Time allocation:</b>	4 Minutes			

<b>Test Item</b>	As a Network administrator, arrange the following steps in their chronological order
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Column A (chronology)	Column B (work steps) in wrong chronology order	
1 <sup>st</sup>	A	Verify System Functionality
2 <sup>nd</sup>	B	Develop a Theory
3 <sup>rd</sup>	C	Plan of Action
4 <sup>th</sup>	D	Identify the Problem
5 <sup>th</sup>	E	Document the Issue
6 <sup>th</sup>	F	Implement the Solution

7 <sup>th</sup>	G	Test the Theory
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<b>Key (answer)</b>	1-D, 2-B, 3-G, 4-C, 5-F, 6-A, 7-E
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<b>DIT/ QS</b>	<b>Test Item Database</b>			
<b>Occupational Title:</b>	Network administrator			
<b>Competence level:</b>	Level 1			
<b>Code no.</b>				
<b>Test Item type:</b>	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
			√	
<b>Complexity level:</b>				
<b>Date of OP:</b>	January 2022			
<b>Related module:</b>				
<b>Time allocation:</b>				

<b>Test Item</b>	Match the following faults to their causes in network administration.
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Column A (Faults)	
1	Wrong IP Addresses
2	Destroyed cables
3	Machine/equipment crushing
4	No same devices communication
5	IP conflict
6	Switch hanging/freezing

Column B (Causes)	
A	Power overload
B	Shared IP on the network
C	Untested cables
D	Rogue DHCP server
E	No trunks
F	Load balancing
G	Straight through cable
H	Cable looping

<b>Key (answer)</b>	1:D, 2:E, 3:A, 4:G,5B:,6:H
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**PERFORMANCE TEST ITEMS (SAMPLES)**

<b>DIT/ QS</b>	<b>Test Item Database Performance Test Item- no. 8</b>
<b>Occupational Title:</b>	Network administrator
<b>Competence level:</b>	Level 1
<b>Code no.</b>	
<b>Test Item:</b>	Set up a local area network(LAN) with basic devices for an enterprise
<b>Complexity level:</b>	P1
<b>Date of OP:</b>	January 2022
<b>Related module:</b>	M1.1, 1.2, 1.3, 1.4
<b>Related skills and knowledge:</b>	<ul style="list-style-type: none"> <li>• Innovativeness,</li> <li>• Decision Making,</li> <li>• Risk taking</li> <li>• Technology transfer and adaptability</li> <li>• Experience sharing</li> <li>• Public relations</li> <li>• Managerial skills</li> <li>• Identify opportunities</li> <li>• Balanced economic development</li> <li>• Terminate cables</li> <li>• hardware and software installation</li> <li>• drawing designs for network layout</li> <li>• configure switches</li> <li>• network security management</li> <li>• critical thinking</li> <li>• communication skills</li> <li>• use of protective gears</li> <li>• numeracy</li> <li>• measurement and dimensions</li> <li>• tool and equipment usage</li> </ul>



	<ul style="list-style-type: none"> <li>• quality assurance</li> <li>• waste management</li> <li>• documentation</li> </ul>
<b>Required tools, Materials and Equipment:</b>	2 computers , networking cables, RJ45, crimping tools, testers, networking tool kit, switches, stationery, routers, trunks, personal protective gears,
<b>Time allocation:</b>	4 hours
<b>Preferred venue:</b>	Site/ computer lab
<b>Remarks for candidates</b>	Candidates must be dressed in full protective gear Observe health, safety and environmental practices
<b>Remarks for assessors</b>	<ul style="list-style-type: none"> <li>• Avail candidates with all required tools, equipment and materials</li> <li>• Provide all the guidelines</li> <li>• Provide a helper</li> </ul>

Assessment criteria	Scoring guide	Max Score	
		Process	Result
Preparation before task	Wore protective gear i.e. Overall Gum boots Gloves Helmet/face masks		1
	Cleaned work area		1
	Selected network devices and patches		1
	Prepared work plan		4
	Assembled tools		2

	Assorted software		1
	Checked power connection	2	1
Set up LAN	Measured work space	3	
	work space map observed		2
	located network points		2
	drilled and fixed trunks	2	
	firm trunks observed		1
	measured cables		4
	cut cables observed		2
	labelled cables observed		2
	fixed cables into trunks		2
	covered trunks		1
	neatly covered trunks observed		1
	Stripped insulators		1
	Arranged cables in colour code standards	2	
	Rightly colour coded cables observed		1
	trimmed cable ends	1	
	even ends observes		1
	inserted cables into RJ45 connector		2

	crimped connector onto cables		1
	labelled cables		1
	test cables		1
	tested cables observed	1	
	tester confirming signal observed		2
	fix devices	2	
	fixed devices observed in their positions		1
	connect devices	1	
	properly connected devices observed		1
	configure devices	2	
	test configured devices	1	
	configured devices observed		2
Tested network	Check communication among network devices	2	
	network devices communication observed		2
	network stability checked	1	

	ping responses observed		1
Generated report	Recorded network points		4
	Documented physical network topology		4
	Documented logical network topology		4
	Recorded challenges and recommendations		2
Cleaned work area	cleared work area		2
	powered off computers		2
	covered computers		2
	locked server areas		2
	Stored tools and equipment		2
	Disposed waste		1
	Removed personal protective gears		2
<b>TOTAL</b>		<b>20</b>	<b>50</b>
<b>Maximum score (Y)</b>	<b>X/Y</b>		

## 4.0 ATP- PART IV

### INFORMATION ON REVIEW PROCESS

#### 4.1 Occupational Profile Development (January 2022)

The Assessment and Training Package was exclusively reviewed by job practitioners of the Network administrator occupation, Secondary School Teachers who double as examiners of IT with the Uganda National Examinations Board (UNEB) and Curriculum Development Specialists working with the National Curriculum Development Centre (NCDC).

The job expert panel, guided by UVQF Facilitators reviewed duties and tasks performed and provided additional generic information regarding the occupation.

#### 4.2 Training Module Development (January 2022)

Based on the reviewed Occupational Profile for Network administrator of January 2022, Training Modules were reviewed by job practitioners, guided by UVQF Facilitators.

#### 4.3 Test Item Development (January 2022)

Based on the reviewed Occupational Profile for Network administrator of January 2022, and Training Modules of January 2022, Test Items were reviewed by combined panels of Teachers and job practitioners, guided by UVQF Facilitators.

#### 4.4 Methodology

The rationale for the Assessment and Training Package development was to link Vocational Education and Training to the real world of work by bridging Occupational Standards to Training Standards through industry-led Standards-Based Assessment.

Active participation of both teachers and job practitioners' panels consolidated the development philosophy.

The panelists worked as teams in workshop settings complemented by off-workshop field research and literature review activities including international benchmarking.

#### 4.5 Development Panels

The participating panelists of Job Practitioners required for the review exercise were constituted by members from the following organizations:

Review Panel		
No.	Name	Institution/Organization
1.	Ddungu Abdul	MoeS
2.	Nsubuga Hood	NCDC
3.	Abigaba Paul	UNEB
4.	Mbatudde Judith	Makerere College School
5.	Kakaire charles	Busoga College Mwiri
6.	Mubangizi Justus	Ntare College School-Mbarara
7.	Laker Monica	St. Joseph's Layibi-Gulu
8.	Natukwatsa Molly	Mary Hill High School- Mbarara
9.	Kato Ronald	NITA-U
10.	Atehwere Arthur	Airtel Uganda
11.	Barisigara Moses Atuheire	HESFB

#### 4.6 Facilitator team

This Assessment and Training Package was developed by a Facilitator team listed below:

- Team Leader** –Ms. Mukyala Ruth, Ag Deputy Director, DIT
- Facilitators** –Ms. Asiimwe Moreen, Verifier, DIT; Mr. Katarihera John Kenedy , Network administrator DIT.
- Compiled by** Ms. Namukasa Christiner, Data Entrant, DIT, Ms. Were Joan, Data Entrant, DIT and edited by Ms. Mukyala Ruth Ag. DD Qualification Standards Dept. DIT
- Coordinated by** – Mr. Byakatonda Patrick, Ag. Director, DIT; and Ms. Mukyala Ruth Ag. DD Qualification Standards Dept. DIT

#### 4.7 Reference time:

The Assessment and Training Package was compiled in January 2022 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

## References

- i LAN Networks and Cabling Systems, 5th Edition by Andrew Oliviero.
- ii Computer Networking for LANS to WANS Hardware, Software and Security by Jr. Kenneth C. Mansfield, James L. Antonakos.
- iii Networking Self-Teaching Guide OSI, TCP/IP, LANs, MANs, WANs, Implementation, Management, and Maintenance by James Edwards, Richard Bramante|2009.
- iv Computer Networking Beginners Guide: The Complete Basic Guide to Master Network Security, Computer Architecture, Wireless Technology and Communications Systems Including Cisco, CCNA and the OSI Model by Kevin Morgan.
- v The Complete Guide: A Complete Guide to Manage Computer Networks and to Learn Wireless Technology, Cisco CCNA, IP Sub-netting and Network Security Paperback – November 8, 2019 by Erick Stack.