

HARDWARE AND NETWORKING SERVICE LEVEL- III



TVET CURRICULUM

Based on December, 2021 Version-IV

Occupational standard (OS)

March, 2022

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Preface

The reformed TVET-System is an outcome-based system. It utilizes the needs of the labor market and occupational requirements from the world of work as the benchmark and standard for TVET delivery. The requirements from the world of work are analyzed and documented – taking into account international benchmarking – as occupational standards (OS).

In the reformed TVET-System, curricula and curriculum development play an important role with regard to quality driven TVET-Delivery. Curricula help to facilitate the learning process in a way, that trainees acquire the set of occupational competences (skills, knowledge and attitude) required at the working place and defined in the occupational standards (OS).

The curriculum development process has been actively supported and facilitated by **Ministry of Labor and Skills** .

Page 1 of 67	Author/Copyright : Ministry of Labor and Skills	Hardware and Networking ServiceLevel- III	Version - I
			March, 2022

TVET-Program Design

1.1. TVET-Program Title: Hardware and Networking Service Level III

1.2. TVET- Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the learners to the standard required by the occupation. The contents of this program are in line with the occupational standard. Learners who successfully completed the Program will be qualified to work as a **Hardware and Network Service Technician** with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the **Economic Infrastructure Sector** in the field of **Hardware and Network Service**.

The prime objective of this training program is to equip the learners with the identified competences specified in the OS. Graduates are therefore expected to: Identify and Resolve Network Problems, Create Technical Documentation, Determine Best-Fit Topology , Monitor and Administer Stem and Network Security, Provide First Level Remote Help Desk, Configure and Administer Server, Install and manage Network protocols in accordance with the performance criteria described in the OS.

1.3. TVET-Program Learning Outcomes

The expected outputs of this program are the acquisition and implementation of the following units of competence –

EIS HNS3 011221 Determine Best-Fit Topology

EIS HNS3 021221 Install and Manage Network Protocols

EIS HNS3 031221 Configure and Administer Server

EIS HNS3 04 1221 Monitor and Administer System and Network Security

EIS HNS3 05 1221 Identify and Resolve Network Problems

EIS HNS3 061221 Provide First Level Remote Help Desk Support

EIS HNS3 071221 Create Technical Documentation

Page 2 of 67	Author/Copyright : Ministry of Labor and Skills	Hardware and Networking ServiceLevel- III	Version - I
			March, 2022

Duration of the TVET-Program

The Program will have duration of **310 hours** including the on school/ Institution training and on-the-job practice or cooperative training time. Such cooperative training based on realities of the industry, nature of the occupation, location of the TVET institution, and other factors will be considered in the training delivery to ensure that trainees acquire practical and workplace experience.

S.N	Unit competency	TVET Institution Training		Cooperative Training	Total Hours	Remarks
		Theory	Practical			
1.	Determine Best-Fit Topology	15	18	17	50	
2.	Configure and Administer Server	36	42	42	120	
3.	Install and Manage Network Protocols	12	14	14	40	
4.	Monitor and Administer System and Network Security	9	11	10	30	
5.	Identify and Resolve Network Problems	9	11	10	30	
6.	Provide First Level Remote Help Desk Support	6	7	7	20	
7.	Create Technical Documentation	6	7	7	20	
Total calculated		93	110	107	310	
Total to be provided						

1.4. Qualification Level and Certification

Based on the descriptors elaborated on the Ethiopian National TVET Qualification Framework (NTQF) the qualification of this specific TVET Program is “**Level III**”.

The learner can exit after successfully completing the Modules in one level and will be awarded the equivalent institutional certificate on the level completed. The learner can also exit after completing any one learning module. However, only certificate of attainment or attendance (this is institutional discretion) will be awarded.

1.5. Target Groups

Any citizen **with or without disability** who meets the entry requirements under items 1.7 and capable of participating in the learning activities is entitled to take part in the Program.

1.7 Entry Requirements

The prospective participants of this program are required to possess the requirements or directive of the Federal TVET Agency.

1.8 Mode of Delivery

This TVET-Program is characterized as a formal Program on middle level technical skills. The mode of delivery is co-operative training. The Training-Institution and identified companies have forged an agreement to co-operate with regard to implementation of this program. The time spent by the trainees in the industry will give them enough exposure to the actual world of work and enable them to get hands-on experience.

The co-operative approach will be supported with school-based lecture-discussion, simulation and actual practice. These modalities will be utilized before the trainees are exposed to the industry environment.

1.9. TVET – Program Structure

Unit of Competence		Module Code & Title		Learning Outcomes	Duration (In Hours)
EIS HNS3 01 1221	Determine Best-Fit Topology	EIS HNS3 M01 0322	Determining Best-Fit Topology	<ul style="list-style-type: none"> Identify key information sources Determine user needs Develop best topology 	50
EIS HNS3 03 1221	Configure and Administer Server	EIS HNS3 M02 0322	Configure and Administer Server	<ul style="list-style-type: none"> Confirm server specification Verify server compatibility and interoperability Configure and test server 	120
EIS HNS3 02 1221	Install and manage Network Protocols	EIS HNS3 M03 0322	Installing and managing Network Protocols	<ul style="list-style-type: none"> Install and manage network protocols Identify network protocol applications 	40
EIS HNS3 04 1221	Monitor and Administer System and Network Security	EIS HNS3 M04 0322	Monitor and Administer System and Network Security	<ul style="list-style-type: none"> . Ensure user accounts are controlled Secure file and resource access Determine authentication requirements Determine network security 	30

EIS HNS3 05 2021	Identify and Resolve Network Problems	EIS HNS3 M05 0322	Identifying and Resolve Network Problems	<ul style="list-style-type: none"> • Implement regular network monitoring • Troubleshoot network problems • Carry out maintenance support on identified problem 	30
EIS HNS3 06 0811	Provide First Level Remote Help Desk	EIS HNS3 M06 0322	Providing First Level Remote Help Desk	<ul style="list-style-type: none"> • Analyze client support issues • Provide advice on software, hardware or network • Obtain client feedback • Lead Workplace Communication 	20
EIS HNS3 047 0811	Create Technical Documentation	EIS HNS3 M7 0322	Creating Technical Documentation	<ul style="list-style-type: none"> • identify and analyze documentation needs • Design documentation • Develop documentation • Evaluate and edit documentation 	20
Total Hours					310

1.10 Institutional Assessment

Two types of evaluation will be used in determining the extent to which learning outcomes are achieved. The specific learning outcomes are stated in the modules. In assessing them, verifiable and observable indicators and standards shall be used.

The **formative assessment** is incorporated in the learning modules and form part of the learning process. Formative evaluation provides the trainee with feedback regarding success or failure in attaining learning outcomes. It identifies the specific learning errors that need to be corrected, and provides reinforcement for successful performance as well. For the teacher, formative evaluation provides information for making instruction and remedial work more effective.

Summative Evaluation the other form of evaluation is given when all the modules in the program have been accomplished. It determines the extent to which competence have been achieved. And, the result of this assessment decision shall be expressed in the term ‘competent or not yet competent’.

Techniques or tools for obtaining information about trainees’ achievement include oral or written test, demonstration and on-site observation.

1.11 TVET Teachers Profile

The teachers conducting this particular TVET Program are A Level and have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE 01	
TVET-PROGRAMME TITLE: Hardware and Networking Service Level III	
MODULE TITLE: Determining Best-Fit Topology	
MODULE CODE: EIS HNS3 M01 0322	
NOMINAL DURATION: 40 Hours	
MODULE DESCRIPTION: This module covers the competence required to determine the most appropriate way of networking computers to meet user needs and business requirement.	
<p>LEARNING OUTCOMES</p> <p>At the end of the module the trainee will be able to:</p> <p>LO1.Identify key information sources</p> <p>LO2.Determine user needs</p> <p>LO3. Develop best topology</p>	
<p>MODULE CONTENTS:</p> <p>LO1. Identify key information sources</p> <ol style="list-style-type: none"> 1.1. Identifying information repositories 1.2. Reviewing current organizational documentation 1.3. Developing critical questions 1.4. Information gathering techniques <p>LO2. Determine user needs</p> <ol style="list-style-type: none"> 2.1. Identifying user needs and establish requirements 2.2. Identifying network segments for proposed network requirements 2.3. Determining Segment needs using functional analysis 2.4. Estimating network traffics/loads <p>LO3. Develop best topology</p> <ol style="list-style-type: none"> 3.1. overview of network topologies 3.2. Determining network resource requirements <ol style="list-style-type: none"> 3.2.1. Tools and equipment's 3.2.2. TCP/IP, Ethernet, hubs, adaptor cards 3.3. Analyzing physical environment features based on network design 3.4. Selecting appropriate network topology 	

Learning Methods:				
For none impaired trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

		❖ Summarize main points		
Demonstration	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ Provide tutorial support (if necessary)
Group discussion	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			❖ Inform the group members to speak loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	<ul style="list-style-type: none"> ❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	<ul style="list-style-type: none"> ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	

ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges
Written test	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1 Identify key information sources

- Information repositories are identified across the business.
- Current organizational documentation is reviewed based on business requirements.
- Critical questions are developed to extract information from key stakeholders using a mixture of open and closed questions.
- Information gathering techniques are ensured to use a quality assurance methodology and meet budgetary constraints.

LO2. Determine user needs

- Different segments are identified for the proposed network based on business requirements.
- Segment needs are determined using network functional analysis.
- Traffic content and volumes are estimated based on business requirements.

LO3. Develop best topology

- Resource requirements for each network segment are determined on the basis of functional analysis.
- Features of the physical environment are analyzed based on network design.
- Costing process is conducted for possible topology options.
- Appropriate network topology is selected and documented based on business requirements and functional analysis.
- Hardware peripherals are tested and confirm client satisfaction, particular attention must be paid to possible impact on other systems and adjustments are made as required.

Annex: Resource Requirements

Page 13 of 67	Author/Copyright : Ministry of Labor and Skills	Hardware and Networking ServiceLevel- III	Version - I
			March, 2022

Determining Best-Fit Topology (EIS HNS3 M01 0322)				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM	<ul style="list-style-type: none"> Prepared by Trainers 	25	1:1
B. Learning Facilities & Infrastructure				
1.	Internet	High speed broad band, Wifi	1	1:25
2.	Library	Multipurpose	1	1:25
3.	Work shop	Well-ventilated class room with IT equipment	1	1:25
4	White board	1.20 X 1.50m	1	1:25
5	Shelves	wooden or metal	1	1:25
C. Consumable Materials				
1.	Blank CD	CD-RW	25	1:1
2	Stationery	Whiteboard marker, printing paper, printer ink	1	1:25
3	Flash disk	San disk or similar 4-8GB	25	1:25
4	Connectors	Terminals, converters, splitters (SATA to IDE, USB) splitter	1	1:25
D. Tools and Equipments				
1.	Computer	HP,Dell	25	1:1
2	Divider	American socket standard	13	1:2
3	Computer accessories(mouse, key board, scanner, printer)	Compatible	1	1:25
4	Projector	LCD	1	1:25
5	Switch	16/24 port	2	1:13

LEARNING MODULE 02

TVET-PROGRAMME TITLE: Hardware and Networking Service Level III

MODULE TITLE: Configuring and Administering Server
MODULE CODE: EIS HNS3 M02 0322
NOMINAL DURATION: 100 hours
MODULE DESCRIPTION: This module defines the competence required to build, configure and test server
<p>LEARNING OUTCOMES</p> <p>At the end of the module the learner will be able to:</p> <p>LO1. Confirm server specification</p> <p>LO2. Verify server compatibility and inter-operability</p> <p>LO3. Configure and test server</p>
<p>MODULE CONTENTS:</p> <p>LO1. Confirm server specification</p> <p>1.1. Overview of Server Operating System</p> <p>1.2. Confirming network operating system, server applications and server Design</p> <p>1.3. Identifying product, vendor architecture and equipment</p> <p>1.4. Identifying technology and resource</p> <p>LO2. Verify server compatibility and inter-operability</p> <p>2.1. Reviewing Hardware and software to ensure compatibility</p> <p>2.2. Obtaining all hardware required</p> <p>2.3. Installing required operating system and software</p> <p>2.4. Installing additional tools or third-party software</p> <p>2.5. Patching operating system and applications</p> <p>LO3. Configure and test server</p> <p>3.1. Configuring server</p> <p>3.1.1 Active Directory domain services(ADDS)</p> <p>3.1.2 Active Directory Lightweight directory services(ADLDS)</p> <p>3.1.3 DNS server</p>

- 3.1.4 DHCP servers
- 3.1.5 Hyper-V
- 3.1.6 Active directory certificate services
- 3.1.7 File services
- 3.1.8 Print services
- 3.1.9 Streaming media services
- 3.1.10 Windows server Update Server(WSUS)
- 3.1.11 Active directory rights management server
- 3.1.12 Web server(IIS)
- 3.1.13 Routing and remote access server
- 3.2. Defining scope and applicability of testing
- 3.3. Developing test plan
- 3.4. Running system test
- 3.5. Analyzing error report and making changes
- 3.6. Validating changes or additions against specifications

LEARNING METHODS:				
For None Impaired Trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision and Blind	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video & in Brail format ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

<p>Demonstration</p>	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ provide tutorial support (if necessary)
<p>Group discussion</p>	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges

<p>Written test</p>	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts/Brail ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment Time extension for trainees having severe upper limb impairment
<p>Demonstration/Observation</p>	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text/Brail ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1. Confirm server specification

- Network operating system, server applications and server design are confirmed with client and system need.
- Product, vendor architecture and equipment specifications are identified according to the system need.
- Technology and resource are identified within business requirements and budget.

LO2. Verify server compatibility and inter-operability

- Hardware and software are reviewed to ensure compatibility.
- All hardware required is obtained for server installation.
- Required operating system and software is Installed for proper function.
- Additional tools or third-party software is installed as required by the created design.
- Operating system and applications is patched to ensure security and reliability.

LO3. Configure and test server

- Server is configured as required by technical requirements.
- Scope and applicability of the testing is defined against technical requirements.
- Test plan is developed with reference to resources and network impact.
- System testing is run according to test plan and record outcomes.
- Error report is analyzed and changes are made as required.
- Changes or additions are validated against specifications.

Annex: Resource Requirements

EIS HNS3 M02 0322		Configuring and Administering Server			
Item No.	Category/Item	Description/ Specifications	Reasonable adjustment for TWD (Specifications)	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials					
1.	TTLM	Prepared by the Trainer	Material with Braille printed and Audio-video form	25	1:1
2.	Reference Books	<p>Microsoft Windows Server 2008 (Author Rand Morimoto)</p> <ul style="list-style-type: none"> • The Complete Idiot's Guide to Upgrading and Repairing PCs (5th Edition) (Complete Idiot's Guides) (Author Jennifer Fulton) • A+ Complete Lab Manual, 3rd Edition (Author Donald R. Evans) • A+ Guide to Hardware: Managing, Maintaining and Troubleshooting, Fourth Edition (Author Jean Andrews) 	In the form of Braille printed and Audio	5	1:5
B. Learning Facilities & Infrastructure					
1	Work shop	- 8x12m; equipped with Networked computer, Internet & Reference Material	Well equipped	1	1:25
2	White Board	1.50 X 1.50		1	:25
C. Consumable Materials					
1	Blank Disk	- CD-R/RW, DVD-R/RW		25	1:1
2	Stationery	- Whiteboard marker or Printing paper, Printer ink,		1	:25
3	Flash disk	San disk or similar 64GB		5	1:5

4	Network cable and RJ-45	UTP Cable – Cat 6E		2 Roll, 1000 pc	
D.	Tools and Equipment's				
1	Computer	Core I3, RAM=4GB, HDD=500GB		25	1:1
2	UPS	1000Volt		2	
3	Divider	American socket supporter		14	
4	LCD Projector	LCD	Jaw software	1	1:25
5	Printer	Lesser Jet		1	1:25
7	Networking Tool kit				
8	Network Devices (Hub, Switches, Repeater)	24 port switch 12 port hub		2 5	1:13 1:5

LEARNING MODULE 03	
MODULE TITLE: Installing and Managing Network Protocols	
MODULE CODE: EIS HNS3 M03 0322	
NOMINAL DURATION: 50 Hours	
MODULE DESCRIPTION: This module covers the performance outcomes, skills and knowledge required to install and manage network protocols in a networking environment	
LEARNING OUTCOMES	
At the end of the module the trainee will be able to:	
LO1. Install and manage network protocols	
LO2. Identify network protocol applications	
MODULE CONTENTS:	
LO1. Install and manage network protocols	
1.1.Overview of network protocols services	
1.2.Selecting, testing and validating appropriate network protocol services	
1.3.Designing a network addressing system, with subnet and host IDs	
1.3.1. IP class address classes	
1.3.2. IP address Sub netting	
1.4.Configuring and testing IP address	
LO2. Identify network protocol application	
2.1. Common network protocol applications	
2.2. Evaluating user requirement and recommend network-protocol services	
2.3. Applying IP addressing scheme	
2.4. Network layers	

Learning Methods:				
For none impaired trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

		❖ Summarize main points		
Demonstration	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ Provide tutorial support (if necessary)
Group discussion	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			❖ Inform the group members to speak loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	<ul style="list-style-type: none"> ❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	<ul style="list-style-type: none"> ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	

ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges
Written test	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1. Install and manage network protocols

- Select, test and validate appropriate network protocol services
- Design a network addressing system, with subnet and host IDs, including appropriate devices
- Configure hosts and workstations to use IP addresses either manually or through automatic allocation of addresses, such as found with dynamic host configuration protocol (DHCP)

LO2. Identify network protocol applications

- Review a range of well-known network protocol applications
- Evaluate client user requirement and recommend network-protocol services
- Apply IP addressing scheme according to approved policy and procedures

Annex: Resource Requirements

Installing and Managing Network Protocols (EIS HNS3 M03 0322)

Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM	<ul style="list-style-type: none"> Prepared by Trainers 	25	1:1
2.	Reference Books			
4.	Journals/Publication/Magazines			
B. Learning Facilities & Infrastructure				
1.	Internet	High speed broad band, Wifi	1	1:25
2.	Library	Multipurpose	1	1:25
3.	Work shop	Well-ventilated class room with IT equipment	1	1:25
4	White board	1.20 X 1.50m	1	1:25
5	shelves	wooden or metal	1	1:25
C. Consumable Materials				
1.	Blank CD	CD-RW	25	1:1
2	Stationery	Whiteboard marker, printing paper, printer ink	1	1:25
3	Flash disk	San disk or similar 4-8GB	25	1:25
4	Connectors	Terminals, converters, splitters (SATA to IDE, USB) splitter	25	1:1
D. Tools and Equipments				
1.	Computer	Dell, Hp	25	1:1
2	Divider	American socket standard	13	1:2
3	Computer accessories(mouse, key board, scanner, printer)	Compatible	1	1:25
4	projector	LCD	1	1:25
5	Switch	16/24 port	2	1:13

LEARNING MODULE 04	
TVET-PROGRAMME TITLE: Hardware and Networking service Level III	
MODULE TITLE: Monitoring and Administering System and Network Security	
MODULE CODE: EIS HNS3 M04 0322	
NOMINAL DURATION: 30 hours	
MODULE DESCRIPTION: This Module defines the competence required to monitor and administer security functions of a system.	
<p>LEARNING OUTCOMES</p> <p>At the end of the module the learner will be able to:</p> <ul style="list-style-type: none"> LO1. Ensure user accounts are controlled LO2. Secure file and resource access LO3. Determine authentication requirements LO4. Determine network security 	
<p>MODULE CONTENTS:</p> <p>LO1. Ensure user accounts are controlled</p> <ul style="list-style-type: none"> 1.1. Modifying default user settings to confirm security policy 1.2. Displaying legal notices at logon 1.3. Using utilities to check strength of passwords and complexity 1.4. Reviewing password procedures 1.5. Identifying security gaps and taking action <p>LO2. Secure file and resource access</p> <ul style="list-style-type: none"> 2.1. Reviewing inbuilt operating system security and accessing features 2.2. Developing or reviewing file security categorization scheme 2.3. Understanding the role of users in security setting 2.4. Implementing and scheduling virus checking process 	

LO3. Determine authentication requirements

- 3.1. Determining user and enterprise security requirements
- 3.2. Identifying and analyzing authentication options
- 3.3. Selecting most appropriate authentication and authorization processes

LO4. Determine network security

- 4.1. Sharing user resources access via a network
- 4.2. Monitoring and recording Security threats
- 4.3. Updating the latest antivirus signatures

LEARNING METHODS:				
For None Impaired Trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision and Blind	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video & in Brail format ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

<p>Demonstration</p>	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ provide tutorial support (if necessary)
<p>Group discussion</p>	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges

<p>Written test</p>	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts/Brail ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment Time extension for trainees having severe upper limb impairment
<p>Demonstration/Observation</p>	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text/Brail ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1. Ensure user accounts are controlled

- Default user settings are modified to ensure that they conform to security policy.
- Previously created user settings are modified to ensure they conform to updated security policy.
- Legal notices are displayed ensured at logon are appropriate.
- Appropriate utilities are used to check strength of passwords and consider tightening rules for password complexity.
- Action taken to ensure password procedures are reviewed with appropriate other internal departments.
- Information services are accessed to identify security gaps and appropriate action taken using hardware and software or patches.

LO2. Secure file and resource access

- Inbuilt security and access features of the operating system are reviewed and considered for further action
- File security categorization scheme, and an understanding of the role of users is developed or reviewed in setting security.
- Virus checking process is implemented and scheduled for the server, computer and other system components.

LO3. Determine authentication requirements

- User and enterprise security requirements are determined with reference to enterprise security plan.
- Authentication options are identified and analyzed according to user and enterprise requirements.
- Most appropriate authentication and authorization processes are selected based on security requirements.

LO4. Determine network security

- Users shared resources access via a network with reference to enterprise security plan
- Security threats are monitored and recorded to the system.
- The latest antivirus signatures are updated.

Annex: Resource Requirements

Monitoring and Administer System and Network Security (EIS HNS3 M07 0322)					
Item No.	Category/Item	Description/ Specifications	Reasonable adjustment for TWD (Specifications)	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials					
1.	TTLM	- Prepared by Trainer	TTLM in Braille printed and Audio	25	1:1
2.	Reference Books	<ul style="list-style-type: none"> • Network Administration with FreeBSD 7 (Author Babak Farrokhi) • Windows NT TCP IP Network Administration (Author Craig Hunt) • Analytical Network and System Administration: Managing Human-Computer Systems (Author Mark Burgess) • UNIX Administration: A Comprehensive Sourcebook for Effective Systems & Network Management (Author Bozidar Levi) • Security+ Guide to Network Security Fundamentals, 3rd Edition (Author Mark Ciampa) 	Reference Books in braille printed and Audio recorded	5	1:5
B. Learning Facilities & Infrastructure					
1	Workshop	- 8x12m; equipped with IT equipment and internet	Well equipped	1	1:25
2.	Cabinet	- metal		1	1:25
C. Consumable Materials					
1.	Blank Disk	- CD-R/RW - DVD/CDRW		25	1:1
2.	Stationery	- Whiteboard marker, printing paper, printer		25	1:1

		ink			
3	Flash disk	SanDisk 32GB		2	1:13
D.	Tools and Equipments				
1	Operating systems	<ul style="list-style-type: none"> • Client operating system (Window 7. window 10 and above) • Server operating system (server 2008, server 2012 and above) 		6	1:5
2	Internet	• Broad band/wireless		1	1:25
3	UPS	- 1000 Watt		2	1:13
4	Divider	• American socket supporter		13	1:2
5	Computer	-Core I3, RAM=4GB, HDD=500GB		25	1:1
7	Multimedia projector	- LCD		1	1:25
8	Printer	- Hp laserJet400		1	1:25
9	Network toolkit	- set/case		5	1:5
10	Maintenance toolkit	- set/case		5	1:5
11	External Hard Disk	1 TB		1	1:25
12	Power Stabilizer	1500 watt		6	1:4

LEARNING MODULE 05	
TVET-PROGRAMME TITLE: Hardware and Networking Service Level III	
MODULE TITLE: Identifying and Resolving Network Problems	
MODULE CODE: EIS HNS3 M05 0322	
NOMINAL DURATION: 40... Hours	
MODULE DESCRIPTION: This module covers the competence required to troubleshoot local area network problems.	
LEARNING OUTCOMES	
At the end of the module the trainee will be able to:	
<ul style="list-style-type: none"> LO1.Implement regular network monitoring LO2.Troubleshoot network problems LO3. Carry out maintenance support on identified problem 	
MODULE CONTENTS:	
<p>LO1. Implement regular network monitoring</p> <ul style="list-style-type: none"> 1.1.Setting up appropriate log <ul style="list-style-type: none"> 1.1.1. Monitor network activities 1.1.2. Produce a management information base (MIB) 1.2.Using network tools <ul style="list-style-type: none"> 1.2.1. Introducing the network tools 1.2.2. Benchmarking network and establishing reference point for network performance 1.3.Reviewing documents and logs regularly 1.4.Making recommendations for improving network performance 	
<p>LO2. Troubleshoot network problems</p> <ul style="list-style-type: none"> 2.1. Addressing help desk and other support services request 2.2. Using network tool, network topology and protocols 2.3. Identifying and solve network problem 2.3. Providing timely advise for users and clients 2.4. Completing support documentation 	

LO3. Carry out maintenance support on identified problem

- 3.1. Conducting diagnostic tests
- 3.2. Completing maintenance
- 3.4. Storing or disposing components

Learning Methods:				
For none impaired trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

		❖ Summarize main points		
Demonstration	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ Provide tutorial support (if necessary)
Group discussion	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			❖ Inform the group members to speak loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	<ul style="list-style-type: none"> ❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	<ul style="list-style-type: none"> ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	

ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges
Written test	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1. Implement regular network monitoring

- An appropriate log is set up to monitor network activity and to produce a management information base (MIB).
- Network tools are used to benchmark the network and to establish a reference point for network performance.
- Documents and logs regularly reviewed to facilitate network tuning.
- Recommendations are made to management for additional network resources to improve performance or to pro-actively avoid problem.

LO2. Troubleshoot network problems

- Help desk and other support services are addressed to quickly identify network problems.
- Various tools and knowledge of network topology and protocols are used to identify and solve network problems.
- Users and clients of progress and solutions are advised in a timely manner.
- Support documentation is completed based organizational requirement.

LO3. Carry out maintenance support on identified problem

- Diagnostic tests around identified problem are conducted based on requirement.
- Maintenance is completed in line with organizational guidelines.
- New components as part of the resolution are obtained where necessary.
Components are stored or dispose in accordance with organizational guidelines.

Annex: Resource Requirements

Identify and Resolving Network Problems (EIS HNS3 M05 0322)				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM	<ul style="list-style-type: none"> Prepared by Trainers 	25	1:1
B. Learning Facilities & Infrastructure				
1.	Internet	High speed broad band, Wifi	1	1:25
2.	Library	Multipurpose	1	1:25
3.	Work shop	Well-ventilated class room with IT equipment	1	1:25
4	White board	1.20 X 1.50m	1	1:25
5	Shelves	wooden or metal	1	1:25
C. Consumable Materials				
1.	Blank CD	CD-RW	25	1:1
2	Stationery	Whiteboard marker, printing paper, printer ink	1	1:25
3	Flash disk	San disk or similar 4-8GB	25	1:25
4	Connectors	Terminals, converters, splitters (SATA to IDE, USB) splitter	25	1:1
D. Tools and Equipments				
1.	Computer	HP,Dell	25	1:1
2	Divider	American Standard	13	1:2
3	Computer accessories(mouse, key board, scanner, printer)	Compatible	1	1:25
4	Projector	LCD	1	1:25
5	Switch	16/24 port	2	1:13

LEARNING MODULE 06

TVET-PROGRAMME TITLE: Hardware and Network service Level III

MODULE TITLE: Providing First Level Remote Help Desk

MODULE CODE: EIS HNS3 M06 0322

NOMINAL DURATION: 15 hours

MODULE DESCRIPTION: This module defines the competence required to provide advice and support to clients including the communication of comprehensive technical information.

LEARNING OUTCOMES

At the end of the module the learner will be able to:

- LO1.** Analyze client support issues
- LO2.** Provide advice on software, hardware or network
- LO3.** Obtain client feedback
- LO4.** Lead Workplace Communication

MODULE CONTENTS:

LO1. Analyze client support issues

- 1.1. Checking new problems logged by client
- 1.2. Checking previous logs for similar problems
- 1.3. Investigating and documenting support issues
- 1.4. Notifying investigation and provide advice and support
- 1.5. Obtaining feedback from client and making changes

LO2. Provide advice on software, hardware or network

- 2.1. Confirming software, hardware or network requirements
- 2.2. Investigating and documenting solution and amount of technical support
- 2.3. Obtaining approval from client
- 2.4. Discuss and agree on level of technical support
- 2.5. Arranging time with client and provide support
- 2.6. Providing manuals and help documentation

LO3. Obtain client feedback

- 3.1. Creating an appropriate evaluation or feedback form
- 3.2. Providing client to complete the form
- 3.3. Distributing evaluation or feedback form
- 3.4. Reviewing feedback for improvement

LO4. Lead Workplace Communication

- 4.1. Selecting Appropriate communication method
- 4.2. Making Constructive contributions to workplace discussion
- 4.3. Organizing Information regarding problems and issues
- 4.4. Raising Communication problems and issues

LEARNING METHODS:				
For None Impaired Trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision and Blind	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video & in Brail format ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

<p>Demonstration</p>	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ provide tutorial support (if necessary)
<p>Group discussion</p>	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges

<p>Written test</p>	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts/Brail ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment Time extension for trainees having severe upper limb impairment
<p>Demonstration/Observation</p>	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text/Brail ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1. Analyze client support issues

- New problems logged by client are checked
- Previous logs for similar problems or requests from client are checked
- Support issues affecting the client are investigated and documented
- Client of the results of investigation and provide advice and support on findings are notified
- Client feedback and make changes are obtained

LO2. Provide advice on software, hardware or network

- Software, hardware or network requirements with clients are confirmed
- Solution for the hardware and software problems are investigated and documented
- Additional requirements discovered in the investigation and refer them to the clients are documented
- Approval from the client to implement the solutions are obtained
- Amount of technical support the client may require are investigated and documented
- Level of technical support identified with the client are discussed and agreed
- Time with the client when support will take place is arranged
- Technical support as part of group or one-to-one instruction to the client is provided
- Manuals and help documentation to the clients are provided

LO3. Obtain client feedback

- An appropriate evaluation or feedback form or other mechanism to gather feedback about the solution and support provided are created.
- Client with instructions on how to complete the form or use other means of providing feedback is provided.
- Evaluation or feedback to the client is distributed.
- Feedback from the client to identify areas for improvement is reviewed.

LO4. Lead Workplace Communication

- Appropriate communication method is selected based on work place guideline.
- Constructive contributions are made to workplace discussions on such issues as production, quality and safety.
- Information regarding problems and issues are organized coherently to ensure clear and effective communication.
- Communication problems and issues are raised as they arise.

Annex: Resource Requirements

Providing First Level Remote Help Desk (EIS HNS3 M06 0322)					
Item No.	Category/Item	Description/ Specifications	Reasonable adjustment or TWD (Specification)	Quantity	Recommended Ratio Item: Trainee
A. Learning Materials					
1.	TTLM	- Prepared by the trainer	TTLM with Braille printed and Audio	25	1:1
2.	Reference Books	<ul style="list-style-type: none"> Practical .NET 2.0 Networking Projects Wei-Meng Lee Help Desk 100 Success Secrets (Author Gerard Blokdijsk) 	Reference Books in braille printed and in electronic form	1	1:5
B. Learning Facilities & Infrastructure					
1	Workshop	- 8x12m; equipped with IT		1	1:25
2.	Shelves	- wooden or metal		5	5:5
3	White Board	1.50 X 1.50		1	1:25
4	Internet Connection	Broad Band /wireless		1	1:25
C. Consumable Materials					
1	Blank CD	- CD-R/RW, CD/DVD/RW		1 pack	1:5
2	Stationery	- Whiteboard marker, printing paper, printer ink		1	1:25
3	Flash disk	SanDisk 64GB		2	1:13
D. Tools and Equipments					
1	Computer	• Desktop i3 500GB,4GB, 2.4 Ghz		25	1:1
2	UPS	• 1000 Volt Amper		2	1:13
3	Divider	• American socket supporter		14	1:2
4	Projector	LCD		1	1:25
5	Printer	Laser Jet		1	1:25

LEARNING MODULE 07

TVET-PROGRAMME TITLE: Hardware and Networking Service Level III

MODULE TITLE: Create Technical Documentation

MODULE CODE: EIS HNS3 M07 0322

NOMINAL DURATION: 25Hours

MODULE DESCRIPTION: This module covers the competence required to create technical documentation that is clear to the target audience and easy to navigation.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

- LO1.** Identify and analyze documentation needs
- LO2.** Design documentation
- LO3.** Develop documentation
- LO4.** Evaluate and edit documentation

MODULE CONTENTS:

LO1. Identify and analyze documentation needs

- 1.1. Consulting client to identify documentation requirements
- 1.2. Interpreting and evaluating documentation requirements
- 1.3. Investigating industry and documentation standards
- 1.4. Defining and documenting scope of work
- 1.5. Consulting client to validate and confirm the scope of work

LO2. Design documentation

- 2.1. Identify information requirements with reference to layout and structure documented
- 2.2. Creating document templates and style guides
- 2.3. Conducting the system review
- 2.4. Extracting content that meets information requirements
- 2.5. Validating technical documentation structure

LO3. Develop documentation

- 3.1. Writing technical documentation
- 3.2. Translating technical terminology
- 3.3. Applying content format and style

LO4. Evaluate and edit documentation

- 4.1. Submitting technical documentation for review
- 4.2. Gathering and analyzing feedback
- 4.3. Incorporating alternatives to the technical documentation
- 4.4. Editing technical documentation

Learning Methods:				
For none impaired trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

		❖ Summarize main points		
Demonstration	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ Provide tutorial support (if necessary)
Group discussion	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			❖ Inform the group members to speak loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	<ul style="list-style-type: none"> ❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	<ul style="list-style-type: none"> ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	

ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges
Written test	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1. Identify and analyze documentation needs

- 1.1. Consulting client to identify documentation requirements
- 1.2. Interpreting and evaluating documentation requirements and confirming with client
- 1.3. Investigating industry and documentation standards
- 1.4. Defining and documenting scope of work
- 1.5. Consulting client to validate and confirm the scope of work

LO2. Design documentation

- 2.1. Identifying information requirements with reference to layout and structure
- 2.2. Creating document templates and style guides
- 2.3. Conducting review of the system
- 2.4. Extracting content that meets information requirements
- 2.5. Developing structure of the technical documentation
- 2.6. Validating technical documentation structure

LO3. Develop documentation

- 3.1. Writing technical documentation
- 3.2. Translating technical terminology to plain English
- 3.3. Applying content format and style

LO4. Evaluate and edit documentation

- 4.1. Submitting technical documentation
- 4.2. Gathering and analyzing feedback
- 4.3. Incorporating alterations into the technical documentation
- 4.4. Editing technical documentation

Annex: Resource Requirements

Create Technical Documentation (EIS HNS3 M07 0322)				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM	<ul style="list-style-type: none"> Information sheet Job sheet Operation sheet 	25	1:1
B. Learning Facilities & Infrastructure				
1.	Internet	High speed broad band, Wifi	1	1:25
2.	Library	Multipurpose	1	1:25
3.	Work shop	Well-ventilated class room with IT equipment	1	1:25
4.	White board	1.20 X 1.50m	1	1:25
5.	Shelves	wooden or metal	1	1:25
C. Consumable Materials				
1.	Blank CD	CD-RW	25	1:1
2.	Stationery	Whiteboard marker, printing paper, printer ink	1	1:25
3.	Flash disk	San disk or similar 4-8GB	25	1:1
4.	Connectors	Terminals, converters, splitters (SATA to IDE, USB) splitter	25	1:1

D.	<i>Tools and Equipments</i>			
1.	Computer	Hp,Dell	25	1:1
2	Divider	American standard	5	1:5
3	Computer accessories(mouse, key board, scanner, printer)	Compatible	13	1:2
4	Projector	LCD	1	1:25
5	Switch	16/24 port	2	1:13

Acknowledgement

The **Ministry of Labor and Skills** and wishes to thank and appreciation for the trainers who donated their effort and time to develop this outcome based curriculum for the TVET program Hardware and Networking Service Level III. We also thank Ministry of Labor and, all regional TVET Colleges for active facilitation of their trainers for the development of this curriculum.

Page 65 of 67	Author/Copyright : Ministry of Labor and Skills	Hardware and Networking ServiceLevel- III	Version - I
			March, 2022

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