

COMPETENCY BASED CURRICULUM



COMPUTER SYSTEMS AND NETWORKING Certificate 2

Department of Workforce Planning and Skills Development
Ministry of Education and Skills Development



COMPETENCY BASED CURRICULUM
COMPUTER SYSTEMS AND NETWORKING
BQF CERTIFICATE 2

Technical Trainers Training and Resource Center
Department of Workforce Planning and Skills Development
Ministry of Education and Skills Development

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FOREWORD

Bhutan has seen a gradual increase in the requirement of skilled workers in recent years due to growth of industries. However, supply of skilled workforce that are responsive to the needs of the industry has not been able to keep in pace with the industry demand. Since the skilled workers are crucial ingredient for socio-economic development of the country, it is important to have adequate number of trained and certified workers. With growing industries, the “Computer Systems and Network technician” are not only the most significant occupation but also have high demand in the labour market. In an effort to meet the skilled human resources requirement in the area of ICT, it is imperative to deliver training based on Competency Based Training system in Computer Systems and Networking to ensure quality and adequate number of workforces in this sector.

To this end, the Department of Workforce Planning and Skills Development (DWPSD) is pleased to present the revised edition of Competency Based Curriculum for Computer Systems and Networking certificate 2 course developed based on revised National Competency Standards (NCS) and using standard curriculum development guidelines. Since it is an outcome of a more participatory process of curriculum development, it is expected to provide training delivery with reformed approaches having its content being directly related to labour market needs, focusing on imparting of skills and assessment based on industry work standards. We believe that the Competency Based Curriculum will help in bridging the skill gap between industry’s needs and training institutes thereby enhance the employability of the technical graduates.

The Department acknowledges the valuable contributions made by institutes, officials, and experts from relevant industries who were involved in the design and development of this curriculum. As it is a dynamic document which may require revision based on the needs of the changing labour market, the Department look forward to receiving valuable feedbacks from the institutes and the industries to further improve and refine the curriculum

The Department hope that this document will help advance Competency Based Learning in most of the TVET Institutions.



Sangay Dorji
Offtg. Director

Department of Technical Education

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COMPETENCY PROFILE
Occupation: Computer Systems and Network Technician

Competency Area	Sub- Competency Area	Competencies/Tasks			
A: Carry out installation and configuration of computer system and devices	A1 Perform Personal computer assembly	A1.01 Fix motherboard	A1.02 Mount Central Processing Unit (CPU)	A1.03 Mount CPU fan	A1.04 Fix Random Access Memory (RAM)
		A1.05 Install add on cards	A1.06 Install Hard Disk Drive (HDD)/Solid State Drive (SSD)	A1.07 Install Switched Mode Power Supply (SMPS)	A1.08 Configure front panel connection
		A1.09 Conduct test			
	A2 Perform data backup	A2.01 Perform cloud-based backup	A2.02 Perform offsite backup	A2.03 Perform Network-Attached Storage (NAS) backup	A2.04 Perform drive cloning
		A2.05 Perform backup using docking station			
	A3 Install operating system and application software	A3.01 Create bootable drive	A3.02 Install Windows OS	A3.03 Install Mac OS	A3.04 Install Linux OS
		A3.05 Install application software	A3.06 Install device driver	A3.07 Format HDD/SSD	A3.08 Customize disk partition

Competency Area	Sub- Competency Area	Competencies/Tasks			
	A4 Install peripheral devices	A4.01 Install printer	A4.02 Install projector	A4.03 Install scanner	A4.04 Set up interactive board
B: Carry out troubleshooting of computer system and devices	B1 Diagnose faults of computer system and devices	B1.01 Test software compatibility	B1.02 Check software update	B1.03 Perform system scan	B1.04 Defragment HDD/SSD
		B1.05 Perform continuity test	B1.06 Diagnose boot error	B1.07 Diagnose frequent auto restart	B1.08 Diagnose Blue Screen of Death (BSOD)
		B1.09 Check laptop screen error	B1.10 Troubleshoot with inbuilt tools	B1.11 Check cable resistance	B1.12 Check network adapter
	B2 Rectify software faults	B2.01 Install software update	B2.02 Repair application software	B2.03 Upgrade software	B2.04 Rectify BSOD error
		B2.05 Repair OS			
	B3 Rectify PC component faults	B3.01 Service cooling mechanism	B3.02 Service Switched Mode Power Supply (SMPS)	B3.03 Replace laptop screen	B3.04 Replace motherboard
		B3.05 Replace laptop/desktop speaker	B3.06 Replace laptop keyboard	B3.07 Replace laptop touchpad	B3.08 Replace WLAN cards
		B3.09 Replace laptop battery			

Competency Area	Sub- Competency Area	Competencies/Tasks			
					
	B4 Rectify peripheral device faults	B4. 01 Service printer	B4.02 Service photocopy machine	B4.03 Service scanner	
C: Carry out installation and configuration of network	C1 Prepare for network installation	C1.01 Conduct site survey	C1.02 Perform estimation and costing	C1.03 Design network topology	C1.04 Prepare ethernet cables
		C1.05 Prepare fiber optic cable			
	C2 Install network	C2.01 Lay network cable	C2.02 Fix Input/Output (I/O) box	C2.03 Install core router	C2.04 Install network switch
		C2.05 Install router/access point	C2.06 Install SFP	C2.07 Install media converter	
	C3 Configure network	C3.01 Subnet IP address	C3.02 Configure core router	C3.03 Configure network switch	C3.04 Configure router/access point
		C3.05 Configure end devices on network	C3.06 Document network details		
D: Carry out network maintenance	D1 Diagnose network faults	D1.01 Analyze network design	D1.02 Check network cable	D1.03 Check signal strength	D1.04 Check network devices

Competency Area	Sub- Competency Area	Competencies/Tasks			
	D2 Perform network maintenance	D2.01 Perform network configuration backup	D2.02 Enhance signal strength	D2.03 Reset router/access point	D2.04 Replace network cable
		D2.05 Monitor network			
	D3 Prepare network maintenance document	D3.01 Prepare maintenance plan	D3.02 Estimate maintenance cost	D3.03 Prepare maintenance report	
E: Carry out installation and configuration of physical security devices	E1 Install CCTV system	E1.01 Prepare surveillance layout	E1.02 Perform estimation and costing	E1.03 Install Digital Video Recorder (DVR)	E1.04 Install Network Video Recorder (NVR)
		E1.05 Install wireless security camera			
	E2 Conduct test for CCTV system	E2.01 Check alignment of CCTV camera	E2.02 Check video playback	E2.03 Check video quality	E2.04 Export CCTV footage
		E2.05 Configure remote access			
	E3 Set up access control system	E3.01 Install access control system	E3.02 Configure access control system	E3.03 Conduct test run	

COURSE INFORMATION	
COURSE TITLE	Computer Systems and Networking
LEVEL	Certificate Level 2
COURSE OBJECTIVE	Upon completion of Computer Systems and Networking C2, the trainee will be able to: • Carry out installation and configuration of computer system and devices • Carry out troubleshooting of computer system and devices • Carry out installation and configuration of network • Carry out network maintenance • Carry out installation and configuration of physical security devices
COURSE DESCRIPTION	This course is designed to provide learners the knowledge, skills and attitude to become competent Computer Systems and Network Technician in accordance with industry standards. Upon completion of this course, the graduates will be able to work in industries where they can perform duties like installation, configuration and troubleshooting of computer system, devices, network system and physical security system. To obtain the qualification of Computer Systems and Networking C2, all learning outcomes prescribed for this qualification must be achieved.
TOTAL DURATION	1754 Hours
TRAINING PROPORTION	1:12 (Practical)
ENTRY REQUIREMENT	1:20 (Theory)
TRAINER QUALIFICATION	Completed Class X passed • Must have a minimum qualification of diploma in Computer Hardware or C3 in Computer hardware and Networking or equivalent with minimum three years of working experience • Must have undergone Training of Trainers-Technical Instruction and Andragogy • Should have good moral character • ¹Must have at least 5 years job/industry experience

¹ Applicable only if institutes hire instructor or guest lecturer from industry

Course Outline

Sl. No	Subject /Module	Duration (Hours)	Content Competencies (Mapped)
1.	Core modules	804	CC
2.	OJT	420	CC
3.	Applied Dzongkha	42	SS
4.	ICT	68	SS
5.	Applied Mathematics	60	SS
6.	Technical English	82	SS
7.	Entrepreneurship	70	SS
8.	Occupational Health and Safety (OHS)	34	ES
9.	Sustainable Consumption and Production (SCP)	36	ES
10.	Professional Ethics	68	PD
11.	Assessment	70	
	Total Course Duration	1754	

Note: (*) This curriculum contains core modules which cover main competencies of Computer Systems and Networking Certificate 2 and OJT component. There are separate curricula for subjects/modules for delivery of soft skills, professional development & values and environmental concern & safety. In order to achieve the qualification of Computer Systems and Networking Certificate 2, the subjects and modules listed must be accomplished as per the credit hours provided.

Content Competencies:

CC-Core Competencies

SS-Soft Skills

PD-Professional Development and Values

ES-Environmental concern and Safety

COURSE STRUCTURE FOR CORE COMPETENCIES

Training Modality	Module Title	Learning Outcomes	Nominal Duration (Hr.)
1. Institute Training	1.1 Carry out installation and configuration of computer system and devices	1.1.1 Perform personal computer assembly 1.1.2 Perform data backup 1.1.3 Install Operating system and application software 1.1.4 Install peripheral devices	222
	1.2 Carry out troubleshooting of computer system and devices	1.2.1 Diagnose faults of computer system and devices 1.2.2 Rectify software faults 1.2.3 Rectify PC component faults 1.2.4 Rectify peripheral device fault	231
	1.3 Carry out installation and configuration of network	1.3.1 Prepare for network installation 1.3.2 Install network 1.3.3 Configure network	162
	1.4 Carry out network maintenance	1.4.1 Diagnose network faults 1.4.2 Perform network maintenance 1.4.3 Prepare network maintenance document	75
	1.5 Carry out installation and configuration of physical security devices	1.5.1 Install CCTV system 1.5.2 Conduct test for CCTV system 1.5.3 Set up access control system	114
2. On the Job Training	1.1 Carry out installation and configuration of computer system and devices	1.1.1 Perform personal computer assembly 1.1.2 Perform data backup 1.1.3 Install Operating system and application software 1.1.4 Install peripheral devices	420
	1.2 Carry out troubleshooting of computer system and devices	1.2.1 Diagnose faults of computer system and devices 1.2.2 Rectify software faults 1.2.3 Rectify PC component faults 1.2.4 Rectify peripheral device fault	
	1.3 Carry out installation and configuration of network	1.3.1 Prepare for network installation 1.3.2 Install network 1.3.3 Configure network	
	1.4 Carry out network maintenance	1.4.1 Diagnose network faults 1.4.2 Perform network maintenance 1.4.3 Prepare network maintenance document	
	1.5 Carry out installation and configuration of physical security devices	1.5.1 Install CCTV system 1.5.2 Conduct test for CCTV system 1.5.3 Set up access control system	
Total Duration			1224

ASSESSMENT	Internal assessment for every module and learning outcome will be done through assignments, project works, continuous assessment, demonstration of practical skills/observations, oral questioning and written test. Summative assessment after completion of each national certificate level will be conducted by TVET Quality Council as per the National Competency Standards and Regulations for National Assessment and Certification System, provided the course is accredited with TVET Quality Council, BQPCA.
CERTIFICATION	On successful completion of every module, the institute will award a certificate of achievement to the trainees. The TVET Quality Council, BQPCA will award a BQF Certificate to the trainees upon the successful completion of each Certificate level assessment.
COURSE DELIVERY	1. Modular 2. Demonstration 3. Lecture 4. Discussion 5. Industrial visits 6. Project based learning 7. Problem based learning
RESOURCES	Materials Motherboard, CPU, CPU fan, hard disk, data cable for drive, power cable, SMPS, optical drive, jumper, system case, screws, manual, network card, NAS device, external HDD, USB, external optical drive, Linux, storage device, bootable CD/DVD, backup software, toner/cartridge, mounting set, printed document, pen, pencil, book, expansion card, eraser, components/devices, thermal paste, RAM, CMOS battery, PC components, spray, soldering lead, soldering wax, soldering iron stand, screen, speaker, keyboard, touchpad with upper casing, cloth piece, lint-free cloth, moistened cloth, screen cleaner kits, paper, casing & capping, casing capping nails, cutting blade, I/O box set, isopropyl alcohol, fiber optic cable, fiber optic patch cable, ethernet patch cable, non-reflective mat, optical fiber disposal container, FDB, cisco router, power strip, network switch, wi-fi router, access point, patch chord, console cable, wireless card, serial to USB converter, network security software, router, monitoring tool software, booster, extender, repeater, pin, scale, CCTV SMPS, digital video recorder, coaxial cable, BNC connector, network video recorder, UTP cable, RJ-45 connector, PoE switch, monitor, mouse, CCTV cameras, screws, dowel, wall plaster, docking station and wire case & cap Tools Screw driver set, hammer, blower, needle-nose plier, plastic picks, tweezers, pry bar, measuring tape, crimping tool, wire stripper, wire cutter, spirit level, hacksaw blade, network impact tool and calculator Instrument Multimeter, network cable tester, OTDR and BNC cable tester

Software

Cloning software and network designing software

Equipment

Computer system, access control system, printer, projector, smart board, portable drilling machine, soldering iron & de-soldering pump, laptop, photocopy machine, scanner, fiber optic cleaver, fiber splicer machine, firewall device, DC power supply unit and access control set

PPE

Working dress, anti-static wrist band, anti-static foot mat, safety boot, dust mask, ear plug/muff, safety gloves, safety goggle and apron

Learning materials

- Reference books
- Hand-outs
- Audio visuals
- Competency Based Learning materials (CBLM)

Infrastructure and training facilities

- **Theory classroom size:** Minimum of 1 square meter per person
- **Practical Workshop size:** Minimum of 2.25 m² per student. Variables must be considered dependent upon type of skills being taught and the number of students being participated at one time.

MODULE INFORMATION:

Computer Systems and Networking BQF Certificate 2

MODULE 1
ON
CARRYING OUT INSTALLATION AND CONFIGURATION OF COMPUTER SYSTEM
AND DEVICES

MODULE INFORMATION

Occupation	Computer Systems and Network Technician
Competency Area	Carry out installation and configuration of computer system and devices
Module Title	Carrying out installation and configuration of computer system and devices
Module Code	3511- L2-M1
Module Description	This module is structured to provide learners the knowledge, skills and right attitude required to perform PC assembly & data backup and install operating system, application software & peripheral devices
Nominal Duration	222 Hours
Qualification Level	BQF level 2
Pre-requisite	Completed class X
Learning Outcome	1. Perform PC assembly 2. Perform data backup 3. Install operating system and application software 4. Install peripheral devices

Module Title	Carrying out installation and configuration of computer system and devices		
Module Code	3511- L2-M1		
Learning Outcome 1	Perform PC assembly		
Duration	Theory:26 hours	Practical:46 hours	Total: 72 hours
Assessment Criteria	• Motherboard is fixed as per the job requirement following standard procedure • Central Processing Unit (CPU) is mounted as per the job requirement following standard procedure • CPU fan is mounted as per the job requirement following standard procedure • Random Access Memory (RAM) is fixed as per the job requirement following standard procedure • Add on cards are installed as per the job requirement following standard procedure • Hard Disk Drive (HDD)/SSD is installed as per the job requirement following standard procedure • Switched Mode Power Supply (SMPS) is installed as per the job requirement following standard procedure • Front panel connection is configured as per the job requirement following standard procedure • Test is conducted as per the job requirement following standard procedure		
Content	A1.00 Introductory Knowledge • History of computer • Classification of computer • Functions of computer • Evolution of computer • Scopes and market trends of Computer Systems and Network technician A1.01 Fixing motherboard Knowledge • Definition of motherboard • Components of motherboard • Types of motherboard • Types of casing • Importance of I/O shield • Function of stand-off Skills • Interpreting manual • Aligning motherboard • Analytical skills • Communication skills		

	<i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper tightening of screw thread A1.02 Mounting Central Processing Unit (CPU) <i>Knowledge</i> • Definition of CPU • Types of CPU ➤ Processing power ➤ Brand ➤ Generation • Importance of checking CPU compatibility • Types of CPU socket <i>Skills</i> • Aligning CPU on socket • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations A1.03 Mounting CPU fan <i>Knowledge</i> • Purpose of locking CPU fan • Types of computer cooling mechanisms and its function • Identification of ports to connect CPU fan • Concept of e-waste management <i>Skills</i> • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious
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	• Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to avoid overtightening of CPU fan lock A1.04 Fixing Random-Access Memory (RAM) <i>Knowledge</i> • Definition of RAM • Function of RAM • Types, size, speed and voltage of RAM • Difference between RAM and ROM <i>Skills</i> • RAM identifying skills • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring equal application of pressure A1.05 Installing add on cards <i>Knowledge</i> • Definition of expansion card • Types of expansion slot • Types of expansion card • Purpose of adding card <i>Skills</i> • Expansion slot identifying skills • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE
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	• Ensuring to follow OHS rules and regulations • Ensuring proper disposal of e-wastes A1.06 Installing Hard Disk Drive (HDD)/ Solid State Drive (SSD) <i>Knowledge</i> • Function of HDD/SSD • Types, size and capacity of HDD/SSD • Type of data & power interface and its functions • Difference between HDD and SSD • Hardware compatibility <i>Skills</i> • Observation skills • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper tightening of screw • Ensuring proper connection and alignment of HDD/SSD A1.07 Installing Switched Mode Power Supply (SMPS) <i>Knowledge</i> • Definition of SMPS • Types of SMPS • Function of SMPS • Components of SMPS • Types of connectors • Voltage rating of SMPS <i>Skills</i> • Using multimeter • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE
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	• Ensuring to follow OHS rules and regulations A1.08 Configuring front panel connection Knowledge • Types of jumper • Function of jumper and LED • Identification of jumper position • Fullform of printed abbreviation Skills • Using magnifying lens • Interpreting manual • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct configuration of jumper A1.09 Conducting test Knowledge • Definition of BIOS/UEFI • Function of BIOS/ UEFI • Identification of object that can be checked physically, visually and audibly • Type of BIOS/ UEFI manufacturer • Identification of key to enter BIOS/ UEFI setup • Difference between BIOS and UEFI Skills • Beep identification skills • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
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	Ensuring correct BIOS/UEFI setup and selection of key
Learning Conditions	Learning materials - Competency Based Learning Materials (CBLM) - Hand-outs - Audio Visuals - Reference books - Manuals Learning facilities and infrastructure - Classroom with adequate facilities - Information Technology (IT) lab - Library - Workshop Materials - Motherboard, CPU, CPU fan, RAM card, hard disk, data cable for drive, power cable, SMPS, SSD, jumper, system case, screws, thermal paste and manual Tools - Screw driver set Instrument - Multimeter Equipment - Computer system PPE - Working dress, dust mask, anti-static wrist band, anti-static foot mat, safety boot and apron
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: - Lecture - Interactive discussion - Demonstration - Industrial training/attachment - Guided practice - Group activity - Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: - Practical demonstration/observation - Case study - Oral/viva-voce - Written test - Assignment

	• Project work
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Module Title	Carrying out installation and configuration of computer system and devices		
Module Code	3511- L2-M1		
Learning Outcome 2	Perform data backup		
Duration	Theory:10 hours	Practical:44 hours	Total: 54 hours
Assessment Criteria	- Cloud-based backup is performed as per the standard procedure - Offsite backup is performed as per the standard procedure - Network-attached storage backup is performed as per the standard procedure - Drive cloning is performed as per the standard procedure - Backup using docking station is performed as per the standard procedure		
Content	A2.01 Performing cloud-based backup Knowledge - Definition of backup - Types of backup storage media - Purpose of data back up - Definition of cloud-based backup - Pros and Cons of cloud-based backup Skills - Analytical skills - Communication skills - ICT skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations A2.02 Performing offsite backup Knowledge - Definition of offsite backup - Types of offsite backup - Function of offsite backup - Advantages and limitations of offsite backup Skills - Analytical skills - Communication skills - ICT skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious		

	• Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations A2.03 Performing Network-Attached Storage (NAS) backup <i>Knowledge</i> • Definition of NAS backup • Advantages and limitations of NAS backup • Differences between NAS and offline backup • Types of software used in NAS backup • File sharing Protocols <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations A2.04 Performing drive cloning <i>Knowledge</i> • Introduction to drive cloning • Prerequisite of drive cloning • Software used for drive cloning • Advantages and limitations of cloning <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
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	- Ensuring same specification of system for cloning A2.05 Performing backup using docking station Knowledge - Introduction to data backup using docking station - Advantages and limitations of data backup using docking station - Types of data backup using docking station Skills - Analytical skills - Communication skills - ICT skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials - CBLM - Hand-outs - Audio visuals - Reference books - Manuals Learning facilities and infrastructure - Classroom with adequate facilities - Library - IT Lab - Workshop Materials - Ethernet cable, NAS device, external HDD, docking station and USB Software - Cloning software Equipment - Computer system and storage device PPE - Working dress

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

Module Title	Carrying out installation and configuration of computer system and devices		
Module Code	3511-L2-M1		
Learning Outcome 3	Install operating system and application software		
Duration	Theory:14 hours	Practical:46 hours	Total:60 hours
Assessment Criteria	• Bootable drive is created as per the standard procedure • Windows Operating System (OS) is installed as per the standard procedure • Mac Operating System (OS) is installed as per the standard procedure • Linux OS is installed as per the standard procedure • Application software is installed as per the standard procedure • Device driver is installed as per the standard procedure • HDD/SSD is formatted as per the standard procedure • Disk partition is customized as per the standard procedure		
Contents	A3.01 Creating bootable drive Knowledge • Definition of Operating System • Types of Operating System • Function of Operating System • Introduction to bootable drive • File format and requirement • Types of bootable media creation tool • Introduction to .ISO Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to download software from official website • Ensure to use minimum of 8GB drive A3.02 Installing Windows OS Knowledge • Versions and service pack of Windows • Hardware compatibility • Purpose of Product key • Methods of installation • Identification of key to enter BIOS/UEFI		

	• Advantages and limitations of windows OS • Types of software Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to check compatibility of hardware with windows OS A3.03 Installing Mac OS Knowledge • Definition of Mac OS • Versions of Mac OS • Hardware compatibility • Methods of installation • Advantages and limitations of Mac OS Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to check compatibility of hardware with Mac OS A3.04 Installing Linux OS Knowledge • Definition of Linux • Features of Linux OS • Advantages and limitations of Linux OS • Types of Linux OS • Differences between Microsoft window and Linux • Basic Linux commands & syntax
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	<i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to check compatibility of hardware to Linux OS A3.05 Installing application software <i>Knowledge</i> • Definition of application software • Function of application software • Pros and cons of trial, pirated and licensed version • Software compatibility <i>Skills</i> • Interpreting “Readme” file • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations A3.06 Installing device driver <i>Knowledge</i> • Function of device manager • Methods to install device driver • Identification of incompatibility sign on device manager • Alternative ways to obtain device driver • Importance of service tag, serial number and model number <i>Skills</i> • Analytical skills • Communication skills • ICT skills
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	<i>Attitude, Safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to check compatibility of device driver A3.07 Formatting HDD/SSD <i>Knowledge</i> • Purpose of formatting • Methods of formatting storage device • File systems <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to avoid repeated formatting A3.08 Customizing disk partition <i>Knowledge</i> • Function of disk management tool ➤ Shrink volume ➤ Delete volume ➤ Format ➤ Change drive letter • Allocation of disk space to create partition • Methods of browsing disk management window <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious
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	• Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructures • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Linux OS, Mac OS, Window OS, external HDD/SSD, storage device, bootable USB drive, bootable creation media and backup software Equipment • Computer system PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

Module Title	Carrying out installation and configuration of computer system and devices		
Module Code	3511-L2-M1		
Learning Outcome 4	Install peripheral devices		
Duration	Theory:8 hours	Practical:28 hours	Total: 36 hours
Assessment Criteria	• Printer is installed as per the standard procedure • Projector is set up as per the standard procedure • Scanner is installed as per the standard procedure • Interactive board is set up as per the standard procedure		
Contents	A4.01 Installing printer Knowledge • Introduction to peripheral devices • Definition of printer • Types of printer • Methods of installing printer • Settings of printer Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to check compatibility of device driver A4.02 Installing projector Knowledge • Definition of projector • Types of projector • Specification of projector • Components of projector • Setting of projector Skills • Mounting skills • Using drill machine • Analytical skills • Communication skills Attitude, Safety and environmental concern • Having work ethics and integrity • Being time conscious		

	• Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste A4.03 Installing scanner <i>Knowledge</i> • Definition of scanner • Types of scanner • Methods of installation • Process of installing scanner tool box <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations A4.04 Setting up interactive board <i>Knowledge</i> • Introduction to interactive board • Types of interactive board • Features of interactive board • Methods of connecting interactive board to external gadgets • Advantages and limitations of interactive board <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
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Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructures • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Pen, paper, cables, mounting set and printed document Tools • Screw driver set, Allen key, spirit level and hammer Equipment • Computer system, printer, scanner, projector, interactive board and portable drilling machine PPE • Working dress, safety boot, dust mask, ear plug/muff, safety goggle and apron
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

MODULE 2
ON
CARRYING OUT TROUBLESHOOTING OF COMPUTER SYSTEM AND
DEVICES

MODULE INFORMATION

Occupation	Computer Systems and Network Technician
Competency Area	Carry out troubleshooting of computer system and devices
Module Title	Carrying out troubleshooting of computer system and devices
Module Code	3511-L2-M2
Module Description	This module is structured to provide the learners with knowledge, skills and right attitude required to diagnose faults of computer system & devices and rectify faults of software, PC components & peripheral devices
Nominal Duration	231 Hours
Qualification Level	BQF Level 2
Pre-requisite	Completed Module: 3511-L2-M1
Learning Outcome	1. Diagnose faults of computer system and devices 2. Rectify software faults 3. Rectify PC component faults 4. Rectify peripheral device faults

Module Title	Carrying out Troubleshooting of Computer System and Devices		
Module Code	3511-L2-M2		
Learning Outcome 1	Diagnose faults of computer system and devices		
Duration	Theory:23 hours	Practical:58	Total:81 hours
Assessment Criteria	• Software compatibility is tested as per the standard procedure • Software update is checked as per the standard procedure • System scan is performed as per the standard procedure • HDD/SSD is defragmented as per the standard procedure • Continuity test is performed as per the standard procedure • Boot error is diagnosed as per the standard procedure • Frequent auto restart is diagnosed as per the standard procedure • Blue Screen of Death (BSOD) is diagnosed as per the standard procedure • Laptop screen error is checked as per the standard procedure • Troubleshooting is performed with inbuilt tools as per the standard procedure • Cable resistance is checked as per the standard procedure • Network adapter is checked as per the standard procedure		
Contents	B1.01 Testing software compatibility Knowledge • Purpose of testing software compatibility • Methods of testing software compatibility • Tools for testing software compatibility Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.02 Checking software update Knowledge • Purpose of updating software • Methods of updating software • Identification of software compatibility • Purpose of testing hardware compatibility • Methods of testing hardware compatibility Skills • Interpreting manual		

	• Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.03 Performing system scan <i>Knowledge</i> • Definition of antivirus and virus • Purpose of scanning • Tools used for system scanning • Types of virus • Types of scan <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.04 Defragmenting HDD/SSD <i>Knowledge</i> • Definition of defragmentation and fragmentation • Purpose of defragmentation • Methods of defragmentation • Configuration of time schedule <i>Skills</i> • Analytical skills • Communication skills • ICT skills
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	<i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.05 Performing continuity test <i>Knowledge</i> • Definition of continuity test • Purpose of continuity test <i>Skills</i> • Using multimeter • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct placement of prob in terminals B1.06 Diagnosing boot error <i>Knowledge</i> • Definition of boot error • Types of boot error • Causes and remedies of boot error • Preventive measures while diagnosing boot error <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite
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	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.07 Diagnosing frequent auto restart Knowledge • Causes and remedies of frequent auto restart • Methods of diagnosing frequent auto restart • Preventive measure to avoid auto restart Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.08 Diagnosing Blue Screen of Death (BSOD) Knowledge • Definition of BSOD • Causes of BSOD • Methods to diagnose BSOD • Preventive measure to avoid BSOD Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.09 Checking laptop screen error Knowledge • Types of display
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	• Causes of screen errors • Methods of checking screen errors Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.10 Troubleshooting with inbuilt tools Knowledge • Purpose of troubleshooting with inbuilt tools • Methods of troubleshooting with inbuilt tools Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B1.11 Checking cable resistance Knowledge • Definition of resistance • Concept of open and close circuit • Purpose of checking resistance • Factors affecting cable resistance Skills • Using multimeter • Analytical skills • Communication skills Attitude, safety and environmental concern
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	• Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct placement of prob in terminals B1.12 Checking network adapter Knowledge • Definition of adapter • Types of adapter • Function of adapter • Tools to check network adapter • Key components to check network adapter Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to check the compatibility of the device
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Pen, pencil, book, eraser, thermal paste, RAM, CMOS battery, PC

	components and power cable Tools • Screw driver set, bootable drive and blower Instrument • Multimeter and cable tester Equipment • Computer system PPE • Working dress, dust mask, anti-static wrist band and anti-static foot mat
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

Module Title	Carrying out Troubleshooting of Computer System and Devices		
Module Code	3511-L2-M2		
Learning Outcome 2	Rectify software faults		
Duration	Theory:10 hours	Practical:20 hours	Total:30 hours
Assessment Criteria	• Software update is installed as per the standard procedure • Application software is repaired as per the standard procedure • Software is upgraded as per the standard procedure • BSOD error is rectified as per the standard procedure • OS is repaired as per the standard procedure		
Contents	B2.01 Installing software update Knowledge • Importance of updating software • Methods of updating software • Types of software update Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to have a continuous internet connection B2.02 Repairing application software Knowledge • Purpose of repairing Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite		

	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B2.03 Upgrading software <i>Knowledge</i> • Purpose of upgrading • Versions of software • Importance of checking compatibility • Difference between upgrading and updating of software <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B2.04 Rectifying BSOD error <i>Knowledge</i> • Causes and remedies of BSOD errors • Purpose of system restore, advance option menu and safe mode • Methods of accessing advance option menu <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations B2.05 Repairing Operating system (OS) <i>Knowledge</i> • Causes and remedies of corrupted files in OS
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	Skills - Analytical skills - Communication skills - ICT skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Being polite - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials - CBLM - Hand-outs - Audio-visuals - Reference books - Manuals Learning facilities and infrastructure - Classroom with adequate facilities - Library - IT lab - Workshop Materials - Software installation file and OS installation media Equipment - Computer system PPE - Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: - Lecture - Interactive discussion - Demonstration - Industrial training/attachment - Guided practice - Group activity - Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: - Practical demonstration/observation - Case study - Oral/viva-voce

	• Written test • Assignment • Project work • Rubrics
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Module Title	Carrying out Troubleshooting of Computer System and Devices		
Module Code	3511-L2-M2		
Learning Outcome 3	Rectify PC component faults		
Duration	Theory:18 hours	Practical:72 hours	Total:90 hours
Assessment Criteria	• Cooling mechanism is serviced as per the standard procedure • SMPS is serviced as per the standard procedure • Laptop screen is replaced as per the standard procedure • Motherboard is replaced as per the standard procedure • Laptop speaker is replaced as per the standard procedure • Laptop keyboard is replaced as per the standard procedure • Laptop touchpad is replaced as per the standard procedure • WLAN cards are replaced as per the standard procedure • Laptop battery is replaced as per the standard procedure		
Contents	B3.01 Servicing cooling mechanism Knowledge • Types of cooling mechanism • Area/components where spray/IC paste can't be used • Function of CPU fan, GPU, IC paste and heat sink Skills • Using blower • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to avoid using spray/IC paste in delicate area B3.02 Servicing Switch Mode Power Supply (SMPS) Knowledge • Concept of voltage, capacitance, resistance and inductance • Purpose of checking voltage • Basic electronic components and its functions ✓ Capacitor ✓ Resistor ✓ Diode ✓ Transistor • Determination of resistor colour coding value		

	<i>Skills</i> • Using soldering iron • Using multimeter • Interpreting resistor colour coding chart • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensure to disconnect electronic devices before testing B3.03 Replacing laptop screen <i>Knowledge</i> • Types of screen and its specification • Causes of screen failure <i>Skills</i> • Observation skills • Using pry tools • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to disconnect the battery before replacing laptop screen B3.04 Replacing motherboard <i>Knowledge</i> • Compatibility of motherboard • Causes of motherboard failure <i>Skills</i> • Observation skills • Analytical skills • Communication skills
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	<i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper tightening of screw • Ensuring to disconnect the battery before replacing motherboard B3.05 Replacing laptop/desktop speaker <i>Knowledge</i> • Types of speaker and its specification • Causes of speaker failure • Types of connector <i>Skills</i> • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to disconnect the battery before replacing speaker B3.06 Replacing laptop keyboard <i>Knowledge</i> • Types of key boards and its specifications • Methods of replacing keyboard • Causes of keyboard damage • Types of connectors <i>Skills</i> • Using pry tool • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious
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	• Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to disconnect the battery before replacing keyboard • Ensure to use plastic pry tools B3.07 Replacing laptop touchpad Knowledge • Compatibility of touch pad connectors • Causes of touchpad failure Skills • Using pry tools • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to disconnect the battery before replacing touch pad B3.08 Replacing WLAN cards Knowledge • Introduction to WLAN cards • Types of WLAN cards • Key features of WLAN card Skills • Using pry tools • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE
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	• Ensuring to follow OHS rules and regulations • Ensuring to disconnect the battery before replacing WLAN card B3.09 Replacing laptop battery Knowledge • Introduction to laptop battery • Types of laptop battery • Power rating of laptop battery • Signs of laptop battery failure Skills • Using pry bar • Analytical skills • Communication skills • Observation skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to disconnect the power before replacing laptop battery
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Spray, cloth, thermal paste, SMPS, soldering lead, de-soldering lead, soldering wax, soldering iron stand, screen, motherboard, speaker, keyboard, battery, WLAN card and touchpad with upper casing Tools • Screw driver set, needle-nose plier, plastic picks, blower, tweezers and pry bar

	Instrument • Multimeter Equipment • Computer system, soldering iron & de-soldering pump and laptop PPE • Working dress, anti-static wrist band and anti-static foot mat
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

Module Title	Carrying out Troubleshooting of Computer System and Devices		
Module Code	3511-L2-M2		
Learning Outcome 4	Rectify peripheral device faults		
Duration	Theory:5 hours	Practical:25 hours	Total: 30 hours
Assessment Criteria	- Printer is serviced as per the standard procedure - Photocopy machine is serviced as per the standard procedure - Scanner is serviced as per the standard procedure		
Contents	B4.01 Servicing printer Knowledge - Common printer errors - Types of printer - Types of printer cartridge Skills - Interpreting error codes - Inserting cartridge - Removing jammed paper - Analytical skills - Communication skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Being polite - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations - Ensuring no paper fragment are left inside - Ensuring proper disposal of used cartridge B4.02 Servicing photocopy machine Knowledge - Types of photocopy machine and its specification - Common photocopy machine errors Skills - Inserting cartridge - Analytical skills - Communication skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Being polite		

	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste • Ensuring to avoid touching any metallic surface in fuser area B4.03 Servicing scanner Knowledge • Types of scanner and its specification • Differences between Automatic Document Feeder (ADF) and flatbed • Types of cleaning materials • Causes of scanner failure Skills • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to avoid use of hard substances to scrub or wipe the glass • Ensuring to avoid excessive force on glass • Ensuring to avoid use of thinner or corrosive solvent to clean the glass surface • Ensuring to avoid spillage of liquid into scanner mechanism or electronic component
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Cartridge, paper, cloth piece, lint-free cloth, moistened cloth and screen cleaner kits

	Tools • Screw driver set and tweezer Equipment • Printer, photocopy machine, vacuum cleaner and scanner PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

MODULE 3
ON
CARRYING OUT INSTALLATION AND CONFIGURATION OF NETWORK

MODULE INFORMATION

Occupation	Computer Systems and Networking Technician
Competency Area	Carry out installation and configuration of network
Module Title	Carrying out installation and configuration of network
Module Code	3511-L2-M3
Module Description	This module is structured to provide the learners with knowledge, skills and right attitude required to prepare for network installation, install network and configure network
Nominal Duration	162 Hours
Qualification Level	BQF Level 2
Pre-requisite	Completed Module: 3511-L2-M2
Learning Outcome	1. Prepare for network installation 2. Install network 3. Configure network

Module Title	Carrying out Installation and Configuration of Network		
Module Code	3511-L2-M3		
Learning Outcome 1	Prepare for network installation		
Duration	Theory: 18 hours	Practical:42 hours	Total:60 hours
Assessment Criteria	• Site survey is conducted as per job requirement following standard procedure • Estimation and costing is performed as per the standard procedure • Network topology is designed as per job requirement following standard procedure • Ethernet cable is prepared as per job requirement following standard procedure • Fiber optic cable is prepared as per job requirement following standard procedure		
Contents	C1.00 Introductory knowledge • Definition of network • History of internet • Types of network • Difference between WAN and LAN • Benefits of network • Types of networking model • Network protocol • Concept of data communication C1.01 Conducting site survey Knowledge • Purpose of network site survey • Factors to consider during site survey • Challenges in network site survey Skills • Using site survey tools • Observation skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations		

	C1.02 Performing estimation and costing Knowledge • Introduction to estimation and costing • Purpose of estimation and costing Skills • Observation skills • Communication skills • Analytical skills • Numeracy skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations C1.03 Designing network topology Knowledge • Definition of topology • Types of network topology • Advantages and limitations of network topology • Functions of topology • Types of networks designing software • Definition of IP addresses • Uses of IP addresses • Classes of IP address Skills • Using network designing software • Communication skills • Analytical skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
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	C1.04 Preparing ethernet cables Knowledge • Types of communication media • Category of Unshielded Twisted Pair (UTP) cables • Color coding of UTP cables • Types of connection and its application Skills • Using crimping tool • Communication skills • Analytical skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations C1.05 Performing fiber optic splicing Knowledge • Function of fiber optic cable • Types of Fiber optic cable and its application • Types of fiber optic patch cable • Color coding of fiber optic cable • Methods of fiber splicing • Advantages and limitations of fiber optic cable • Function of Optical Time-Domain Reflectometer (OTDR) • Tools, materials and equipment required for fiber optic networking Skills • Using fiber splicer machine • Using fiber optic cleaver • Using OTDR • Using visual fault locator (VFL) laser • Communication skills • Analytical skills • Observation skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite
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	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Paper, pencil, eraser, RJ-45 connectors, LC, SC, FC and network cables Tools • Measuring tape, crimping tool, wire stripper and wire cutter Equipment • Computer system, OTDR, fiber splicer machine, fiber optic cleaver and VFL laser Software • Network designing software PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out Installation and Configuration of Network		
Module Code	3511-L2-M3		
Learning Outcome 2	Install network		
Duration	Theory:14 hours	Practical:34 hours	Total:48 hours
Assessment Criteria	• Cable is laid as per job requirement following standard procedure • I/O box is fixed as per job requirement following standard procedure • Core router is installed as per job requirement following standard procedure • Network switch is installed as per job requirement following standard procedure • Router/access point is installed as per job requirement following standard procedure • SFP is installed as per job requirement following standard procedure • Media converter is installed as per job requirement following standard procedure		
Contents	C2.01 Laying Cable Knowledge • Specification of materials • Methods of laying cable • Purpose of casing & capping • Types of network cable Skills • Interpreting drawing • Communication skills • Analytical skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste C2.02 Fixing I/O box Knowledge • Function of I/O box • Function of network impact tools • Standard color coding Skills • Using network impact tools • Using portable drilling machine		

	• Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste C2.03 Installing core router <i>Knowledge</i> • Definition of core router • Function of core router • Types of router and its manufacturer <i>Skills</i> • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct connection of incoming and outgoing cables C2.04 Installing network switch <i>Knowledge</i> • Function of network switch • Types of network switch and its specification • Standard power rating of POE network switch <i>Skills</i> • Interpreting installation manual • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources
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	• Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct configuration of incoming and outgoing ports C2.05 Installing router/access point <i>Knowledge</i> • Introduction to wireless network • Introduction to Access Point (AP) controller • Functions of wireless router or AP • Difference between router and access point <i>Skills</i> • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring selection of proper router location C2.06 Installing Small Form-Factor Pluggable (SFP) <i>Knowledge</i> • Introduction to SFP • Specification of SFP • Function of SFP • Difference between SFP transceiver and SFP receiver • Introduction to SFP electrical and SFP optical <i>Skills</i> • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE
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	• Ensuring to follow OHS rules and regulations C2.07 Installing media converter Knowledge • Introduction to media converter • Types of media converter • Wave length and transmission distance of media converter • Difference between transceiver and receiver Skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Case & cap, casing capping nails, pencil, cutting blade, screws, dowel, IO box set, isopropyl alcohol, fiber optic cable, non-reflective mat, optical fiber disposal container, RJ-45 connectors, FDB, lint-free wipes, core router, network cable, power strip, network switch, router, console cable, protection sleeve, SFP, enclosure, media converter and access Point (AP) Tools • Hammer, spirit level, hacksaw blade, screw driver set, network impact tool, wire stripper, wire cutter/shears, punching tool and tweezers Instrument • OTDR and VFL laser

	Equipment • Portable drilling machine, fiber optic cleaver, fiber splicer machine, switch, router and computer system PPE • Working dress, safety boot, ear plug/muff, dust mask, safety goggle and safety gloves
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work • Rubrics

Module Title	Carrying out Installation and Configuration of Network		
Module Code	3511-L2-M3		
Learning Outcome 3	Configure network		
Duration	Theory:12 hours	Practical:42 hours	Total:54 hours
Assessment Criteria	• IP address is subnet as per the standard procedure • Core router is configured as per job requirement following standard procedure • Network switch is configured as per job requirement following standard procedure • Router/Access point is configured as per job requirement following standard procedure • End device on network is configured as per job requirement following standard procedure • Network details are documented as per job requirement following standard procedure		
Contents	C3.01 Subnetting IP address <i>Knowledge</i> • Classes of IP addressing • Definition of subnetting • Purpose of subnetting • IP address and its version • Introduction to subnet mask, binary conversion and CIDR notation <i>Skills</i> • Communication skills • Analytical skills • Numeracy skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct configuration of commands C3.02 Configuring core router <i>Knowledge</i> • Definition of ISP • Basic configuration commands of core router • CLI configuration mode		

	✓ User Exec mode ✓ Privilege Exec mode ✓ Global configuration mode ✓ Interface configuration mode ✓ Line configuration mode • Introduction to Network Address Translation (NAT), IP routing and Dynamic Host Configuration Protocol (DHCP) • Types of terminal emulator • Default port numbers (SSH, TelNET, HTTP, HTTPS) • Introduction to Domain Name System (DNS) • Procedure for enabling SSH <i>Skills</i> • Interpreting CLI commands • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct configuration of commands C3.03 Configuring network switch <i>Knowledge</i> • Basic Command Line Interface (CLI) commands • Purpose of configuring network switch • Difference between router, firewall and network switch • Introduction to Virtual Local Area Network (VLAN) • Procedure of enabling SSH <i>Skills</i> • Interpreting CLI commands • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite
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	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations C3.04 Configuring router/access point <i>Knowledge</i> • Key features of wireless router/access point ✓ Dual band/tri band ✓ Wireless standard ✓ Security protocol ✓ Remote management/mobile app ✓ Mac filtering ✓ Time scheduling <i>Skills</i> • Communication skills • Analytical skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations C3.05 Configuring end devices on network <i>Knowledge</i> • Differences between Dynamic Host Configuration Protocol (DHCP) and static IP address • Basic network troubleshooting commands <i>Skills</i> • Interpreting CLI commands • Communication skills • Analytical skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite
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	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct assignment of IP address C3.06 Documenting network details Knowledge • Format for maintaining network details • Drawing network diagram Skills • Communication skills • Analytical skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Being polite • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Console cable, LAN/Wireless card, serial to USB converter, network cable, pen, pencil, eraser and paper Tools • Calculator, crimping tools, cable tester and screwdriver set Equipment • Computer system, Access point, core router and network switch

	PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

MODULE 4
ON
CARRYING OUT NETWORK MAINTENANCE

MODULE INFORMATION

Occupation	Computer Systems and Networking Technician
Competency Area	Carry out network maintenance
Module Title	Carrying out network maintenance
Module Code	3511-L2-M4
Module Description	This module is structured to provide learners the knowledge, skills and right attitude required to diagnose networks faults, perform network maintenance and prepare network maintenance document
Nominal Duration	75 Hours
Certificate Level	BQF Certificate Level 2
Pre-requisite	Completed Module: 3511-L2-M3
Learning Outcome	1. Diagnose network faults 2. Perform network maintenance 3. Prepare network maintenance document

Module Title	Carrying out Network Maintenance		
Module Code	3511- L2-M4		
LearningOutcome1	Diagnose network maintenance		
Duration	Theory:6 hours	Practical:12 hours	Total: 18 hours
Assessment Criteria	• Network design is analyzed as per job requirement following standard procedure • Network cable is checked as per job requirement following standard procedure • Signal strength is checked as per job requirement following standard procedure • Network devices is checked as per job requirement following standard procedure		
Content	D1.01 Analyzing network design Knowledge • Concept of network analysis • Purpose of network analysis Skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations D1.02 Checking network cable Knowledge • Causes of faulty network cable • Types of network cable test Skills • Using cable tester • Using OTDR • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials		

	• Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring to use calibrated device D1.03 Checking signal strength <i>Knowledge</i> • Purpose of checking network signal strength • Methods of checking network signal strength • Tools used for checking network signal strength • Factor affecting network signal strength <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations D1.04 Checking network devices <i>Knowledge</i> • Causes of network device failure • Tools used for checking network device failure <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio Visuals

	• Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Network diagram, pencil, paper, eraser, network cable, switch, RJ-45 connector, patch cable and router Tools • Screw driver set Instrument • Network cable tester and OTDR Equipment • Computer system PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out Network Maintenance		
Module Code	3511- L2-M4		
Learning Outcome 2	Perform network maintenance		
Duration	Theory:11 hours	Practical:34 hours	Total: 45 hours
Assessment Criteria	• Network configuration backup is performed as per job requirement following standard procedure • Signal strength is enhanced as per job requirement following standard procedure • Router/access point is reset as per job requirement following standard procedure • Network cable is replaced as per job requirement following standard procedure • Network is monitored as per job requirement following standard procedure		
Content	D2.01 Perform network configuration backup Knowledge • Importance of network configuration backup • Selection of storage media • Methods of network configuration backup Skills • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations D2.02 Enhancing signal strength Knowledge • Definition of decibel milliwatts (dBm) • Commands to view dBm • Methods of enhancing signal strength • Causes of signal fluctuations • Function of repeaters, boosters and extender Skills • Analytical skills • Communication skills • ICT skills		

	<i>Attitude, safety and environmental concern</i> ● Having work ethics and integrity ● Being time conscious ● Being efficient in using resources ● Having patience ● Proper handling and storage of tools and materials ● Ensuring appropriate use of PPE ● Ensuring to follow OHS rules and regulations ● Ensuring proper selection of wireless router location D2.03 Re-setting router/access point <i>Knowledge</i> ● Purpose of resetting ● Factory default setting ● Difference between hard and soft reset <i>Skills</i> ● Analytical skills ● Communication skills <i>Attitude, safety and environmental concern</i> ● Having work ethics and integrity ● Being time conscious ● Being efficient in using resources ● Having patience ● Proper handling and storage of tools and materials ● Ensuring appropriate use of PPE ● Ensuring to follow OHS rules and regulations D2.04 Replacing network cable <i>Knowledge</i> ● Purpose of replacing cable <i>Skills</i> ● Analytical skills ● Communication skills <i>Attitude, safety and environmental concern</i> ● Having work ethics and integrity ● Being time conscious ● Being efficient in using resources ● Having patience ● Proper handling and storage of tools and materials ● Ensuring appropriate use of PPE ● Ensuring to follow OHS rules and regulations
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	D2.05 Monitoring network Knowledge • Purpose of network monitoring • Types of network monitoring • Types of network monitoring software Skills • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT Lab • Workshop Materials • Storage device, router, switch, access point, booster, network cable, extender, repeater, pin, RJ-45 connector and monitoring software Tools • Crimping tool, wire stripper and wire cutter Instrument • Network cable tester and OTDR Equipment • Computer system PPE • Working dress

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out Network Maintenance		
Module Code	3511-L2-M4		
Learning Outcome 3	Prepare network maintenance document		
Duration	Theory:4 hours	Practical:8 hours	Total:12 hours
Assessment Criteria	• Maintenance plan is prepared as per job requirement following standard procedure • Maintenance cost is estimated as per job requirement following standard procedure • Maintenance report is prepared as per job requirement following standard procedure		
Contents	D3.01 Preparing maintenance plan Knowledge • Check list for maintenance plan • Methods of preparing maintenance plan Skills • Interpreting network topology diagram • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste D3.02 Estimating maintenance cost Knowledge • Preparation of Bill of Quantity (BoQ) • Factors affecting maintenance cost Skills • Interpreting network topology diagram • Numeracy skills • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials		

	• Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations D3.03 Preparing maintenance report Knowledge • Key elements of maintenance report • Purpose of recording maintenance activities Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructures • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Pen, pencil, scale, eraser and paper Tools • Calculator Equipment • Computer system PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture

	• Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

MODULE 5
ON
CARRYING OUT INSTALLATION AND CONFIGURATION OF PHYSICAL
SECURITY DEVICES

MODULE INFORMATION

Occupation	Computer Systems and Network Technician
Competency Area	Carry out installation and configuration of physical security devices
Module Title	Carrying out installation and configuration of physical security devices
Module Code	3511- L2-M5
Module Description	This module is structured to provide learners the knowledge, skills and right attitude required to install CCTV system, conduct test for CCTV system and install access control system
Nominal Duration	114 Hours
Certificate Level	Certificate 2
Pre-requisite	Completed Module: 3511-L2-M4
Learning Outcome	1. Install CCTV system 2. Conduct test for CCTV system 3. Install access control system

Module Title	Carrying out Installation and Configuration of Physical Security Devices		
Module Code	3511- L2-M5		
Learning Outcome 1	Install CCTV System		
Duration	Theory: 20 hours	Practical: 46 hours	Total: 66 hours
Assessment Criteria	- Surveillance layout is prepared as per job requirement following standard procedure - Estimation and costing is performed as per the standard procedure - DVR is installed as per job requirement following standard procedure - NVR is installed as per job requirement following standard procedure - Wireless security camera is installed as per job requirement following standard procedure		
Content	E1.00 Introductory knowledge - Definition of security system - Importance of security system - Functions of security system - Types of security system - Components of security system E1.01 Preparing surveillance layout Knowledge - Definition of surveillance - Importance of surveillance layout Skills - Analytical skills - Communication skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations - Ensuring proper disposal of waste E1.02 Performing estimation and costing Knowledge - Purpose of estimation and costing Skills - Interpreting drawing - Numeracy skills - Analytical skills - Communication skills Attitude, safety and environmental concern		

	• Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste E1.03 Installing Digital Video Recorder (DVR) Knowledge • Introduction to CCTV system • Components of CCTV system • Purpose of CCTV • Types and specifications of CCTV camera • Difference between analog and digital camera • Requirement of power voltage for CCTV camera • Definition of DVR • Types of DVR • Functions of DVR • Features of DVR • Application of BNC and Power jack • Types of CCTV cable • Purpose of CCTV SMPS Skills • Observation skills • Using portable drilling machine • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations E1.04 Installing NVR Knowledge • Definition of NVR • Types of NVR • Features of NVR • Differences between NVR and DVR
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	• Voltage and power rating of POE switch and IP camera Skills • Observation skills • Using portable drill machine • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste E1.05 Installing wireless security camera Knowledge • Definition of wireless security camera • Function of wireless security system • Advantages and limitations of wireless security system • Types of wireless camera Skills • Observation skills • Using portable drill machine • Analytical skills • Communication skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring proper disposal of waste
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio Visuals • Reference books • Manuals

	Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, paper, pencil, eraser, scale, SMPS, monitor, digital video recorder, coaxial cable, BNC connector, SD card, hard disk, network video recorder, UTP cable, RJ-45 connector, PoE switch, insulation tape and security camera Tools • Screw driver set, crimping tools, pliers and cutting knife Instrument • Multimeter, network cable tester and BNC cable tester Equipment • Portable drilling machine and DC power supply unit PPE • Working dress, dust mask, anti-static wrist band, anti-static foot mat, safety boot and apron
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out Installation and Configuration of Physical Security Devices		
Module Code	3511- L2-M5		
Learning Outcome 2	Conduct test for CCTV system		
Duration	Theory:6 hours	Practical:12 hours	Total: 18 hours
Assessment Criteria	- Alignment of CCTV camera is checked as per job requirement following standard procedure - Video playback is checked as per job requirement following standard procedure - Video quality is checked as per job requirement following standard procedure - CCTV footage is exported as per the standard procedure - Remote access is configured as per the job requirement following standard procedure		
Content	E2.01 Checking alignment of CCTV camera Knowledge - Importance of CCTV camera alignment - Introduction to Field of View (FoV) Skills - Observation skills - Analytical skills - Communication skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations E2.02 Checking video playback Knowledge - Purpose of checking video playback - Methods of checking video playback Skills - Analytical skills - Communication skills - ICT skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience		

	• Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations E2.03 Checking video quality <i>Knowledge</i> • Definition of resolution • Purpose of checking video quality • Types of video resolution • Video file format <i>Skills</i> • Analytical skills • Communication skills • ICT skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations E2.04 Exporting CCTV footage <i>Knowledge</i> • Purpose of exporting CCTV footage • Methods of exporting CCTV footage • Introduction to CCTV frame rates <i>Skills</i> • Analytical skills • Communication skills <i>Attitude, safety and environmental concern</i> • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensure to avoid sharing of CCTV footage to unauthorized individuals E2.05 Configuring remote access <i>Knowledge</i> • Advantage and limitation of remote access
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	• Ways to add devices to remote access Skills • Analytical skills • Communication skills • ICT Skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Library • IT Lab • Workshop Materials • DVR/NVR, monitor, HDD, mouse and cameras Tools • Screwdriver set Equipment • Ladder and computer system PPE • Working dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice

Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work
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Module Title	Carrying out Installation and Configuration of Physical Security Devices		
Module Code	3511-L2-M5		
Learning Outcome 3	Install access control system		
Duration	Theory:6 hours	Practical:24 hours	Total: 30 hours
Assessment Criteria	- Access control system is installed as per job requirement following standard procedure - Access control system is configured as per job requirement following standard procedure - Test run is conducted as per job requirement following standard procedure		
Contents	E3.01 Installing access control system Knowledge - Definition of access control system - Working principle of access control system - Types of access control system - Components of access control system Skills - Using drill machine - Analytical skills - Communication skills - ICT skills Attitude, safety and environmental concern - Having work ethics and integrity - Being time conscious - Being efficient in using resources - Having patience - Proper handling and storage of tools and materials - Ensuring appropriate use of PPE - Ensuring to follow OHS rules and regulations - Ensuring proper disposal of waste E3.02 Configuring access control system Knowledge - Uses of access software - Types of locks - Procedures for user enrolment - Process of installation and configuration of application software Skills - Analytical skills - Communication skills - ICT skills Attitude, Safety and environmental concern - Having work ethics and integrity - Being time conscious		

	• Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct configuration E3.03 Conducting test run Knowledge • User interfaces • Purpose of testing access control system Skills • Analytical skills • Communication skills • ICT skills Attitude, safety and environmental concern • Having work ethics and integrity • Being time conscious • Being efficient in using resources • Having patience • Proper handling and storage of tools and materials • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulations • Ensuring correct configuration
Learning Conditions	Learning materials • CBLM • Hand-outs • Audio-visuals • Reference books • Manuals Learning facilities and infrastructures • Classroom with adequate facilities • Library • IT lab • Workshop Materials • Screws, dowel, wall plaster, wire case & cap, cables, application software, ethernet cable and USB drive Tools • Hammer, wire stripper, screw driver set and crimping tools Equipment • Portable drilling machine, computer system and access control set

	PPE • Working dress, safety boot, dust mask, ear plug, safety goggle and apron
Instructional Methodologies	The trainer shall use <i>inter alia</i> , the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial training/attachment • Guided practice • Group activity • Individual practice
Method of Assessment	The trainer shall use <i>inter alia</i> , the following assessment methods: • Practical demonstration/observation • Case study • Oral/viva-voce • Written test • Assignment • Project work

ON-THE-JOB TRAINING (OJT)

COURSE	Computer Systems and Networking BQF C2
DESCRIPTION	The trainee will be attached with relevant industries for OJT program. During the OJT, the trainees will be exposed to real life working environment where they are expected to develop technical skills and learn positive working attitudes including life skills.
OBJECTIVE	After completion of OJT, learners will be able to • Develop critical thinking, creativity, collaboration and communication skills • Develop information, media and technology literacy • Adopt flexible and productive working attitude • Develop leadership skills • Apply initiatives • Develop social skills • Adopt OHS practices • Carry out installation and configuration of computer system and devices • Carry out troubleshooting of computer system and devices • Carry out installation and configuration of network • Carry out network maintenance • Carry out installation and configuration of physical security devices
DURATION	420 Hours
CONDITIONS FOR OPERATION OF OJT	• The institute shall select relevant and reliable industry for OJT attachment • The trainee shall be attached in Computer Hardware and Networking related activity for at least 70% of the total OJT duration • The industry shall maintain daily attendance of the trainee • The trainee shall maintain OJT logbook as per the OJT guideline • The trainee is required to follow company's rule • The collaborating industry shall provide working facilities • The industry shall assess performance of trainees • The industry shall provide feedback in the logbook

EVALUATION	The industry shall evaluate the trainees on the trainee's performance through observation and use of logbook. The evaluation shall be done on the following aspects of trainees: ➤ Critical thinking ➤ Creativity ➤ Collaboration ➤ Communication ➤ Information literacy ➤ Media literacy ➤ Conversant to up-to-date technology ➤ Flexibility ➤ Leadership ➤ Initiative ➤ Productivity ➤ Social skills ➤ Core skills
REPORT	The trainee shall submit comprehensive report on OJT to the Institute

What is Competency-Based Curriculum (CBC)

- ✓ A competency-based curriculum is a framework or guide for the subsequent detailed development of competencies, associated methodologies, training and assessment resources.
- ✓ The CBC specifies the outcomes which are consistent with the requirements of the workplace as agreed through the industry or community consultations.
- ✓ CBC can be developed immediately when competency standards exist.
- ✓ When competency standards do not exist, curriculum developers need to clearly define the learning outcomes to be attained. The standard of performance required must be appropriate to industry and occupational needs through the industry/enterprise or specified client group consultations.

The CBC materials are available in both printed and electronic copies.

ANNEXES
Annex I: Assessment Sample

Unit of competency	Drive Light Vehicle
Unit Code	8322-U4-L2
Module Title	Driving Light Vehicle
Module Code	8322-U4-L2-M1
Time Duration	45 min *
Problem or Project: Drive Light Vehicle	
Introduction: Perform pre-operating procedure before starting the vehicle. Drive light vehicle under different environment conditions following standard traffic rules and defensive driving techniques. Perform post operating procedure after parking the vehicle.	
Observation: (How will you be assessed as Competent?) Your performance will be assessed based on the following criteria: • Performance of pre and post operating procedure as per standard practices; • Application of standard procedure while starting the LMV; • Demonstrating the driving skills in different road condition using the system of vehicle control (SOVC); • Demonstrating your adherence to RSTA Rules, Defensive Driving; • The final outcome of your driving skills	
Note: For Assessor/Institute for preparation for assessment. Materials and Equipment for 1 candidate • LMV in good running condition with all necessary vehicle documents 2. Roles and responsibilities of assessors (before/during and after assessment) • Identify in advance the different road environment (rough road, town, simulated night and poor light condition, highway) • During assessment let the candidate demonstrate moving off, reversing, overtaking, and parking.	

Assessor/ Observation Check List

Unit of competency	Drive Light Vehicle		
Unit Code	8322-U4-L2		
Module Title	Driving Light Vehicle		
Module Code	8322-U4-L2-M1		
Problem/Project: Drive Light Vehicle	Psychomotor (Practical) domain level: P2		
Candidate's Name:			
Place of Assessment:		Date of Assessment:	
A. During the demonstration of skills did the candidate do following:	Marks allocated	Marks received	Remarks
1. Check mirror settings, fluid level, tire pressure and required documents.	4		
2. Start LMV according to the procedure of standard starting procedure (Cockpit Drill)	2		
3. Move off and steer LMV wearing seat belts and without stalling the engine*	3		
4. Reverse LMV safely without stalling the engine*	3		
5. Park LMV safely in the centre of given parking area following standard parking procedure	2		
6. Drive LMV on the highway according to the road conditions following the road safety signs.	2		
7. Drive LMV in towns according to the traffic signs and signals.	2		
8. Drive LMV on 4WD safely (if necessary and available)	1		
9. Giving pass and overtake the vehicle safely according to the road and weather condition *	3		
10. Stop LMV safely in a given area according to standard stopping procedure	1		
B. Is the job outcome correct in the following areas?			
Caused no accidents and damages to the vehicle.*	5		
Total marks obtained	28		
The Candidate's performance was:	Satisfactory:		
	Not Satisfactory:		

Note: The questions marked with * are the critical questions which the trainees must be able to answer. Otherwise, they will be rated unsuccessful even if they perform well in the practical exam. The mark **P** is for the psychomotor domain level (P1- Simple Routine Assignment; P2- Questions related to Simple Routine Assignment and P3- Questions not related to Simple Routine Assignment)

Oral Questions checklist:

Unit of competency	Drive Light Vehicle
Unit Code	8322-U4-L2

Module Title		Driving Light Vehicle		
Module Code		8322-U4-L2-M1		
Problem/Project: Drive Light Vehicle				
Candidate's Name:				
Place of Assessment:		Date of Assessment:		
Questions (and its domain level) to be answered by the trainee / candidate:	Key Answer	Marks allocated	Marks obtained	Remarks
Why do you keep the vehicle in start mode for a few minutes before moving? (Verifying observations) (C1)				
In case of accidents who will you contact first? (contingency questions) (C2)				
While entering intersection, before how many seconds do you have to give signal? (verifying observations) (C3)				
Total Marks Obtained				
The candidate's performance was:		Satisfactory:		
		Not Satisfactory:		
Assessor's Name:		Signature:		

Note: The questions marked with C describes the cognitive level of the questions. C1- Remembering; C2- Functional Understanding and C3- Problem Solving.

Written questions checklist:

Unit of competency	Drive Light Vehicle		
Unit Code	8322-U4-L2		
Module Title	Driving Light Vehicle		
Module Code	8322-U4-L2-M1		
Problem/Project: Drive Light Vehicle			
Candidate's Name:			
Place of Assessment:		Date of Assessment:	
Questions (and its domain level) to be answered by the trainee/ candidate:	Key Answer	Marks Allocated	Marks Obtained
1. List down three types of parking. (Short Answer Question) (C1)	Angle, Straight and Parallel Parking	1	
2. All of the following are honking prohibited places EXCEPT : (C2) a. pedestrian crossing c. traffic jam b. public procession d. curves and bends (Multiple Choice Question)	d	2	
3. According to RSTA Regulations how much is the penalty for drunk driving?(C1)	Nu. 1750	1	
4. Match the following signs in column A with the indications in column B. (Matching Type) (C2) Column A 1.  2.  3.  Column B a. Give way b. Restriction End c. Compulsory Ahead d. Pedestrian Prohibited	1-c, 2-a, 3-d	3	
Total marks obtained			
The Candidate's performance was:		Satisfactory:	
		Not Satisfactory:	
Assessor's Name:		Signature:	
The Candidate's overall result:	Competent:		
	Not Yet Competent:		
Feedback to Candidate: (Provide feedback to the candidate on how they could improve – especially if they are not competent)			

I am satisfied with the way assessment was conducted: (Please include reasons if not satisfied) Candidate Name: Signature: Date:	YES	NO
---	-------------------	------------------

Assessor Name:

Signature:

Training Provider:

Date:

Annex II: Module Recognition

This is to verify that

Mr/Ms.....

has completed module on

.....

Covering following learning outcomes:

1.
2.
3.

Instructor:

Head of the Department:

.....

.....

Signature:

Signature:

Date: / / (dd/mm/yyyy)

Date: / /(dd/mm/yyyy)

Head of the Institute:

Trained Assessor (Institute)/Exam OC:

.....

.....

Signature:

Signature:

Date: / ... / (dd/mm/yyyy)

Date: / /(dd/mm/yyyy)

Annex III: Lesson Plan

Lesson Plan

[illegible]

No. of Trainees:				
Sl. No.:	Instructional materials/resources	Specifications	Qty.	Remarks
Prepared by :		Signature	Date:	
Revised by:		Signature	Date:	
Approved by:		Signature	Date:	

Task sheet

TS-1/4: Practical Plan

Course Title:		N C Level:
Module code:		Duration:
Module Title		
Learning outcome		
Skills/Task Title:		Task no:

Terminal Performance Objective:

Given:

Cue:

Who:

What:

Within:

How well:

-

-

-

Enabling Objectives (Related Skills):

By the end of a lesson, the learners will be able to:

i)

ii)

iii)

iv)

Activities	Who (T/L)	How (methods/ media)	Duration

Project/Assignment:

TS-2/4: Tool and Equipment required:				
Sl no.	Particulars	Specifications	Qty.	Remarks

Training Materials required:

<i>Sl no.</i>	<i>Particulars</i>	<i>Specifications</i>	<i>Qty.</i>	<i>Rate</i>	<i>Amount</i>	<i>Remarks</i>

TS-3/4:Performance Guide

Skill/Task:

Date:

Directions: Use the following performances criteria to rate the learner. Check YES/NO to indicate whether the learner performed each step as indicated or not?

Sl. No:	Steps	Yes	No

Note:
Critical steps:*All * marked steps should be carried out very carefully.* For a quality performance guide, all items should be checked “YES”

TS-4/4: Instruction and Drawing
General Instructions for Trainees i) ii) iii) iv)
Drawing (if any)

Safety Precaution i) ii) iii)		
Prepared by :	Signature	Date:
Revised By:	Signature	Date:
Approved by :	Signature	Date:

Annex IV: Course Plan
Institutes letter head and Logo

(Trade)YEAR PLAN- _____Semester_____ (Year)

Trade: NC Level:			Schedule																																Total Hour s														
Module Code	Module Title	Learning Outcome	Feb.				March				April				May				June				July				Aug.				Sept					Oct.				Nov.									
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2	3	4										

Monthly/Weekly Plan

Month:

Trade:

Trainer:

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 01							
Week 02							
Week 03							
Week 04							
Week 05							

Developed by:

Approved by:

Date

Annex V: Time Distribution					
Computer Systems and Networking					
Module	Learning outcomes	Tasks	Theory (hours)	Practical (hours)	Total (hours)
A: Carry out installation and configuration of computer system and devices	A1 Perform Personal computer assembly	A1.00 Introductory knowledge	6	0	6
		A1.01 Fix motherboard	4	14	18
		A1.02 Mount Central Processing Unit (CPU)	2	4	6
		A1.03 Mount CPU fan	2	4	6
		A1.04 Fix Random Access Memory (RAM)	2	4	6
		A1.05 Install add on cards	2	4	6
		A1.06 Install Hard Disk Drive (HDD)/SSD	2	4	6
		A1.08 Install Switched Mode Power Supply (SMPS)	2	4	6
		A1.09 Configure front panel connection	2	4	6
		A1.10 Conduct test	2	4	6
	Sub Total Duration		26	46	72
	A2 Perform data backup	A2.01 Perform cloud-based backup	2	10	12
		A2.02 Perform offsite backup	2	10	12
		A2.03 Perform network-attached storage backup	2	10	12
		A2.04 Perform drive cloning	2	10	12
		A2.05 Perform backup using docking station	2	4	6
	Sub Total Duration		10	44	54
		A3.01 Create bootable drive	2	4	6
	A3 Install operating system and application software	A3.02 Install Windows OS	2	10	12
		A3.03 Install Linux OS	2	10	12
		A3.04 Install application software	2	10	12
		A3.05 Install device driver	2	4	6
		A3.06 Format HDD/SSD	2	4	6
		A3.07 Customize disk partition	2	4	6
	Sub Total Duration		14	46	60
	A4 Install peripheral devices	A4.01 Install printer	2	10	12
		A4.02 Install projector	2	10	12
		A4.03 Install scanner	2	4	6
		A4.04 Set up interactive board	2	4	6
	Sub Total Duration		8	28	36
	Total Duration		58	164	222
		B1.01 Test software compatibility	2	4	6
		B1.02 Check software update	2	4	6
		B1.03 Perform system scan	2	4	6

		B1.04 Defragment HDD/SSD	2	4	6
		B1.05 Perform continuity test	2	4	6
		B1.06 Diagnose boot error	2	10	12
		B1.07 Diagnose frequent auto restart	2	4	6
		B1.08 Diagnose Blue Screen of Death (BSOD)	2	4	6
		B1.9 Check screen error	2	10	12
		B1.10 Troubleshoot with inbuilt tools	2	4	6
		B1.11 Check cable resistance	2	4	6
		B1.12 Check network adapter	1	2	3
	Sub Total Duration		23	58	81
	B2 Rectify software faults	B2.01 Install software update	2	4	6
		B2.02 Repair application software	2	4	6
		B2.03 Upgrade software	2	4	6
		B2.04 Rectify BSOD error	2	4	6
		B2.05 Repair OS	2	4	6
	Sub Total Duration		10	20	30
	B3 Rectify PC component faults	B3.01 Service cooling mechanism	2	4	6
		B3.02 Service SMPS	4	14	18
		B3.03 Replace laptop screen	2	10	12
		B3.04 Replace motherboard	2	10	12
		B3.05 Replace laptop/desktop speaker	2	10	12
		B3.06 Replace laptop keyboard	2	10	12
		B3.07 Replace laptop touchpad	2	10	12
		B3.08 Replace WLAN cards	1	2	3
		B3.09 Replace laptop battery	1	2	3
	Sub Total Duration		18	72	90
	B4 Rectify peripheral device faults	B4.01 Service printer	2	10	12
		B4.02 Service photocopy machine	2	10	12
		B4.03 Service scanner	1	5	6
	Sub Total Duration		5	25	30
	Total Duration		56	175	231
C: Carry out installation and configuration of network	C1 Prepare for network installation	C1.00 Introductory knowledge	6	0	6
		C1.01 Conduct site survey	2	4	6
		C1.02 Perform estimation and costing	2	4	6
		C1.02 Design network topology	2	10	12
		C1.03 Prepare network cables	2	4	6
	Sub Total Duration		14	22	36
	C2	C2.01 Lay network cable	2	10	12

	Install network	C2.02 Fix Input/Output (I/O) box	2	4	6
		C2.03 Perform fiber optics splicing	4	20	24
		C2.04 Install firewall device	2	4	6
		C2.05 Install core router	2	4	6
		C2.06 Install network switch	2	4	6
		C2.07 Install router/access point	2	4	6
		C2.08 Install SFP	1	2	3
		C2.09 Install media converter	1	2	3
	Sub Total Duration		18	54	72
	C3 Configure network	C3.01 Configure core router	2	10	12
		C3.02 Configure network switch	4	14	18
		C3.03 Configure router/access point	4	14	18
		C3.04 Configure end devices on network	1	2	3
		C3.06 Document network details	1	2	3
	Sub Total Duration		12	42	54
	Total Duration		44	118	162
D: Carry out network maintenance	D1 Diagnose network faults	D1.01 Analyze network design	1	2	3
		D1.02 Check network cable	2	4	6
		D1.03 Check signal strength	1	2	3
		D1.04 Check network devices	2	4	6
	Sub Total Duration		6	12	18
	D2 Perform network maintenance	D2.01 Perform network configuration backup	2	10	12
		D2.02 Enhance signal strength	2	4	6
		D2.03 Reset router/access point	1	2	3
		D2.04 Replace network cable	2	4	6
		D2.05 Monitor network	4	14	18
	Sub Total Duration		11	34	45
	D3 Prepare network maintenance document	D3.01 Prepare maintenance plan	2	4	6
		D3.02 Estimate maintenance cost	1	2	3
		D3.03 Prepare maintenance report	1	2	3
	Sub Total Duration		4	8	12
	Total Duration		21	54	75
E: Carry out installation and configuration of physical security devices	E1 Install CCTV system	E1.00 Introductory knowledge	6	0	6
		E1.01 Prepare surveillance layout	2	4	6
		E1.02 Perform estimation and costing	2	4	6
		E1.03 Install CCTV camera	4	14	18
		E1.04 Install DVR	2	10	12
		E1.05 Install NVR	2	10	12

		E1.06 Install wireless security camera	2	4	6
	Sub Total Duration		20	46	66
		E2.01 Check alignment of CCTV camera	1	2	3
	E2 Conduct test for CCTV system	E2.02 Check video playback	1	2	3
		E2.03 Check video quality	1	2	3
		E2.04 Export CCTV footage	1	2	3
		E2.05 Configure remote access	2	4	6
	Sub Total Duration		6	12	18
	E3 Install access control system	E3.01 Install access control system	2	10	12
		E3.02 Configure access control system	2	10	12
		E3.03 Conduct test run	2	4	6
	Sub Total Duration		6	24	30
	Total Duration		32	82	114
	Grand Total Duration (Hours)		211	593	804



For more information please contact:

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