



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

COMPUTER SYSTEM MAINTENANCE

CSACM301

MAINTAIN COMPUTER SYSTEM

Competence

RQF Level: 3

Learning Hours

Credits: 6



Sector: ICT & Multimedia

Trade: Computer Systems and Architecture

Module Type: Specific

Curriculum: ICTCSA3001-TVET Certificate III in Computer Systems and Architecture

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Purpose statement	This module describes the skills, knowledge and attitude required to maintain computer system. This module intends to prepare learners pursuing TVET Level 3 in Computer Systems and Architecture. At the end of this module the learners will be able to maintain computer hardware, maintain computer software and manage e-waste.					
Learning assumed to be in place	<ul style="list-style-type: none"> ▪ Apply basics of chemistry ▪ Apply basics of electricity ▪ Apply electronics fundamentals ▪ Implement electronic circuit ▪ Apply network fundamentals ▪ Assemble PCB and computer system ▪ Deploy computer system ▪ Deploy computer peripheral 					
Delivery modality	Training delivery		100%	Assessment		Total 100%
	Theoretical content		30%	Formative assessment		30%
	Practical work:		70%			50%
	• Group work and presentation	30%				
	• Individual work	40%	Summative Assessment		50%	

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1.Maintain Computer Hardware	1.1. The workplace is properly prepared according to the activities to be done
	1.2. Tools, equipment and materials are correctly selected based on maintenance activities
	1.3. Computer hardware is appropriately diagnosed based on its functionality
	1.4. The computer hardware is properly disassembled based on the system requirements

	1.5. Possible solutions are properly applied based on diagnostic findings
	1.6. The computer system hardware is effectively tested according to computer hardware functionalities
2.Maintain Computer Software	2.1. Tools and Equipment are correctly selected based on maintenance activities
	2.2. The computer software is appropriately diagnosed based on computer software functionality
	2.3 The computer software is effectively troubleshoot based on the software functionalities
3.Manage e-waste	3.1. Tools, equipment and materials are correctly selected according to the work to be done
	3.2.E-waste disposal safety measures are properly applied based on e-waste management standard
	3.3 E-waste are properly categorized according to their types
	3.4 E-waste are efficiently treated based on e-waste treatment procedures
	3.5 Maintenance report is properly prepared based on maintenance work done

Course content

Learning outcomes	At the end of the module the learner will be able to: 1.Maintain Computer Hardware 2.Maintain Computer System Software 3.Manage e-waste
Learning outcome 1: Maintain Computer Hardware	Learning hours: 35
Indicative content	
<ul style="list-style-type: none"> • Introduction to computer maintenance <ul style="list-style-type: none"> ✓ Key terms  Maintenance 	

- ✓ Common hardware Faults and causes
- ✓ Perform computer hardware troubleshoot process
- **Implementation of computer assembling procedures**

Resources required for the learning outcome

Equipment	<ul style="list-style-type: none"> ▪ PPEs ▪ Power protection devices (UPS, SPS, SPD)
Materials	<ul style="list-style-type: none"> ▪ Internet bundles ▪ Power extension ▪ Thermal Paste ▪ Cleaning materials ▪ Adhesive materials ▪ Cable ties
Tools	<ul style="list-style-type: none"> ▪ PC Repair Toolkit ▪ Cleaning tools ▪ ESD Tools ▪ Diagnostic tools ▪ Hand tools
Facilitation techniques	<ul style="list-style-type: none"> ▪ Brainstorming ▪ Demonstration and simulation ▪ Individual and group work ▪ Group discussion
Formative assessment methods /(CAT)	<ul style="list-style-type: none"> ▪ Written assessment ▪ Oral presentation ▪ Performance assessment

Learning outcome 2: Maintain Computer System Software

Learning hours: 30

Indicative content

- **Introduction to computer software maintenance**

- ✓ Software maintenance
- ✓ Drivers
- ✓ Backup and restore
- ✓ Recovery
- ✓ Activation
- ✓ Update and upgrade

- **Perform Preventive software maintenance**

- ✓ Disk management
 -  Defragmentation
 -  Disk clean up
 -  Disk partition
- ✓ Software security
 -  Anti-malware
 -  Firewall
- ✓ Backup and restore

- **Troubleshoot software**

- ✓ Interpret BIOS information
- ✓ Update and upgrade procedures
- ✓ Repair software
- ✓ Replace software
- ✓ Windows activation
- ✓ Test software

Resources required for the learning outcome

Equipment	<ul style="list-style-type: none"> ▪ Computer ▪ Peripherals (Printer, scanner, projector, MODEM, External CD Room) ▪ UPS
Materials	<ul style="list-style-type: none"> ▪ Internet bundles ▪ Software license ▪ Storage devices

	<ul style="list-style-type: none"> ▪ Power extension
Tools	<ul style="list-style-type: none"> ▪ Operating System ▪ Application software ▪ Utilities software (Drivers, antivirus)
Facilitation techniques	<ul style="list-style-type: none"> ▪ Demonstration ▪ Brainstorming ▪ Individual and group work ▪ Practical exercise
Formative assessment methods / (CAT)	<ul style="list-style-type: none"> ▪ Written assessment ▪ Oral presentation ▪ Performance assessment

Learning outcome 3: Manage e-waste	Learning hours: 15
Indicative content	
<ul style="list-style-type: none"> • Description of E-waste <ul style="list-style-type: none"> ✓ Key terms <ul style="list-style-type: none">  E-waste  Recycling  Refurbishment  Cannibalization  Disposal ✓ E-waste hazards and toxic components ✓ E-waste effects on environment and human health ✓ E-waste categories ✓ Benefits of e-waste management • Description of e-waste Health and safety precautions • Treatment of e-waste <ul style="list-style-type: none"> ✓ E-waste Refurbishment/ Cannibalization practice ✓ E-waste recycling ✓ E-waste Disposal • Perform maintenance report <ul style="list-style-type: none"> ✓ Elements of maintenance report 	

-  Status before maintenance
-  Activity Procedures
-  Status after maintenance
-  Conclusion and Recommendations

Resources required for the learning outcome

Equipment	<ul style="list-style-type: none"> ▪ Computer ▪ PPEs ▪ Power protection devices (UPS, SPS, SPD)
Materials	<ul style="list-style-type: none"> ▪ Internet bundles ▪ Power extension ▪ Thermal Paste ▪ Cleaning materials ▪ Ties ▪ Damaged electronic devices (computers, printers, batteries)
Tools	<ul style="list-style-type: none"> ▪ PC Repair Toolkit ▪ Cleaning tools ▪ ESD Tools ▪ Diagnostic tools ▪ Hand tools ▪ MS Office
Facilitation techniques	<ul style="list-style-type: none"> ▪ Brainstorming ▪ Individual and group work ▪ Practical exercise
Formative assessment methods /(CAT)	<ul style="list-style-type: none"> ▪ Written assessment ▪ Performance assessment

Integrated/Summative assessment (For specific module)

Integrated situation

X-Base Group is a private organization that serves private agencies responsible for performing PC and server computer maintenance, and it works with the **2x ltd** institution located at Nyagatare City as sub-contractor.

2x ltd declared that they have 2 computers that are not operating, one of them doesn't display anything on screen, another one rebooting many times as long as it is switched on and those computers contain important enterprise data. The X-Base group wants to maintain those computers for **2x ltd**. As one of X-Base IT technician, you are requested to solve those issues.

Based on the information given above, perform the activity to find the solution so that the computers must operate normally. After doing the maintenance activity, prepare the report that reflect to the work done. [how to he will use e waste. The duration of the work is 4 hours.

Resources

Tools	HDD Enclosure, OS, storage devices, Brush, Magnetic Telescoping Pick Up Tool, Prier, air blower, hard disk tester, cleaning tools, Application software, Drivers, antivirus, ESD toolkit
Equipment	Computer, Table.
Materials/ Consumables	Data cables, expansion card, Internet bundles, power extension, Thermal Paste, cleaning materials, cable ties

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Maintain computer hardware (60%)	The workplace is properly prepared according to the activities to be done	Workplace is cleaned			2
		Tables arranged			2
		Power extension is connected			2
	Tools, equipment and materials are correctly selected based on	Equipment is selected			2
		Tools are selected			2

	maintenance activities	Materials are selected			2
	Computer hardware is appropriately troubleshooted based on its functionality	Data is gathered			2
		Problem is identified			5
		The causes are identified			4
		Possible solutions are applied			6
	The computer hardware is properly disassembled based on the system requirements	Power cable is disconnected			2
		Peripherals are disconnected			2
		VGA cable is checked			3
		VGA port is checked			2
		Case is opened			2
		Power supply is checked			5
		RAM is checked			5
		Processor is checked			2
		Component is fixed			3
		Problem is fixed			5

Manage E-waste (10%)	E-waste is efficiently treated based on e-waste treatment procedures	Damaged parts are identified			5
		Damaged parts are collected			3
		Damaged parts are kept safely			2
Maintain computer software (30%)	Tools and Equipment are correctly selected based on maintenance activities	Software tools are selected			2
		Bootable media is created			3
		Backup tool is identified			2
	The computer software is appropriately troubleshooted based on computer software functionality	Data gathered			2
		Problem is identified			3
		The causes are identified			3
		Possible solutions are applied			3
		Data backup is performed			3
		OS is installed/ repaired			5
		Solution is implemented			4
Total marks:					100
Percentage Weightage:					100%
Minimum Passing line % (Aggregate):					70%

References

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List of abbreviations

BIOS: Basic Input/Output System

CAT: Continuous Assessment Test

CD: Compact Disk

ESD: Electrostatic Discharge

E-Waste: Electronic Waste

HDD: Hard Disk Drive

ICT: Information and Communication Technology

MS: Microsoft

OS: Operating System

PC: Personal Computer

PPE: Personal Protecting Equipment

RAM: Random Access Memory

RQF: Rwanda Qualification Framework

SPD: Surger Protection Device

SPS: Standby Power Suply

TVET: Technical and Vocational Education and Training

UPS: Uninterruptible Power Supply

VGA: Video Graphics Array