TELEPHONE MAINTENANCE

CSATM301

MAINTAIN TELEPHONE

Competence

RQF Level:	3

Learning Hours

50

Credits:	5
Sector:	ICT and 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 Telephone. This module is intended to prepare learners pursuing TVET Level 3 in Computer Systems and Architecture. At the end of this module the learners will be able to assemble telephone hardware parts, deploy telephone software and repair telephone.
Learning assumed to be in place	Safety Health and Environment at Workplace, Computer Literacy, Applied chemistry, English, Electronics Fundamentals, Fundamentals of Electricity, Electronic Circuit Implementation, Basics of Technical Drawing and Network Fundamentals.

Delivery modality	Training delivery		100%	Assessment		Total 100%
	Theoretical content		30%	Formative assessment	30%	50%
	Practical work:		70%		70%	
	• Group work and presentation	30%				
	• Individual Work	40%				
				Summative Assessment		50%

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. **Assemble Telephone hardware parts**	1.1. Telephone model is properly identified according to the manufacturer's manual.
	1.2. Assembling Tools are appropriately identified based on Telephone model.
	1.3. Telephone hardware parts are properly selected according to phone model.
	1.4. Telephone hardware parts are properly assembled according to manufacturer's manual.
2. **Deploy Telephone software**	2.1 Telephone firmware is properly selected based on Telephone model.

	2.2 Telephone firmware is successfully installed based on telephone model.
	2.3 Telephone applications are successfully installed based on installed Operating System.
	2.4 Telephone is effectively tested according to its functionalities.
3. Repair Telephone	3.1 Tools, materials and equipment are correctly selected according to the work to be done.
	3.2 Hardware faults are properly identified based on diagnostic findings.
	3.3 Hardware faults are successfully fixed according to identified faults.
	3.4 Software problems are successfully fixed according to software issues.
	3.5 Repairing report is correctly elaborated based on work done.

Course content

Learning outcomes	At the end of the module the learner will be able to:
	1. Assemble telephone hardware parts
	2. Deploy telephone software
	3. Repair telephone

Learning outcome 1: Assemble telephone hardware parts	Learning hours: 20

Indicative content

- **Introduction to Telephones**
  - ✓ Description of Telephones technology
  - ✓ Identification of different types of cell phones
  - ✓ Description of parts of a conventional Telephone
- **Identification of Telephone hardware parts**
  - ✓ Feature phone parts
  - ✓ Smart phone parts
- **Assembling Telephones hardware**
  - ✓ Identification of tools
    - Cell phones tool kit.
    - ESD Tools
    - Cleaning tools
  - ✓ Interpretation of SOP
    - SOP Parts
    - SOP Types
  - ✓ Perform Telephone assembly procedures
    - Assemble Feature phone
    - Assemble Smart phone

Resources required for the learning outcome

Equipment	▪ Soldering Station
	▪ SMD Rework Station or Hot Air Blower
	▪ Multmeter

	▪ BGA Kit ▪ DC Power Supply ▪ Oscilloscope ▪ Function Generator
Materials	▪ Solder Wire ▪ Thinner or PCB Cleaner ▪ Ultrasonic Cleaner ▪ Liquid flux ▪ Solder paste ▪ ESD-Safe Cleaning Brush ▪ Desoldering Wire/wick
Tools	▪ Soldering Iron ▪ PCB Holder ▪ Precision Screwdriver ▪ Battery Booster or Battery Eliminator ▪ Magnifying Lamp ▪ Mobile Opener ▪ LCD Tester
Facilitation techniques	▪ Brainstorming ▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Group discussion
Formative assessment methods /(CAT)	▪ Written assessment ▪ Oral presentation and Performance assessment

Learning outcome 2: Deploy Telephone software	**Learning hours: 10**
Indicative content	

- **Introduction to Telephone firmware**
  - ✓ Key Terms
    - ➕ Phone model
    - ➕ Firmware
    - ➕ Operating System
    - ➕ Mobile Application
  - ✓ Importance of Telephone device firmware
  - ✓ Types of firmware
- **Description of Telephone Operating System**
  - ✓ Functions
  - ✓ Features of Telephone Operating System
  - ✓ Components of Telephone Operating System
  - ✓ Pointers for Telephone Operating Systems
    - ➕ Hardware Limitations
    - ➕ Software Limitations
    - ➕ Other Correspondences
    - ➕ Future Scope
  - ✓ Comparison on different Operating Systems
- **Installation of Telephone Operating System**
  - ✓ Android OS
  - ✓ iOS
  - ✓ Windows
  - ✓ Ubuntu Touch
  - ✓ BlackBerry
  - ✓ Tizen
- **Installation of mobile applications**
  - ✓ Identification of Mobile Applications Stores
  - ✓ Performing Mobile Application Installation procedure
- **Testing Telephone**
  - ✓ Description of Telephone Testing
    - ➕ Need for Telephone Testing
    - ➕ Types of Telephone Testing
    - ➕ Apps for Testing a mobile phone

	✓ Perform mobile phone testing procedure

Resources required for the learning outcome	
Equipment	▪ Computer ▪ Mobile phone
Materials	▪ Applications packages ▪ Telephone firmware ▪ App Licenses, ▪ Internet bundles ▪ Phone USB Connectors
Tools	▪ Odin ▪ Miracle Thunder Box ▪ SP Flash Tool
Facilitation techniques	▪ Demonstration ▪ Individual or Group work ▪ Practical exercise
Formative assessment methods /(CAT)	▪ Oral presentation ▪ Written assessment ▪ Performance assessment ▪ Product based assessment

Learning outcome 3: Repair Telephone	**Learning hours: 20**
Indicative content	

- **Selection of Tools, materials and equipment**
  - ✓ Tools
    - Cleaning tools
    - ESD Tools
    - Diagnostic tools
    - Hand tools
    - Flashing tools
  - ✓ Materials

- ✓ Equipment
    - 🔧 Flasher boxes
    - 🔧 Testing equipment
- **Perform phone hardware repair**
    - ✓ Common Hardware Faults and Repair Procedures
        - 🔧 Repairing Faulty Charging Circuits
        - 🔧 Audio and Alert Faults
        - 🔧 Video/Graphic/Display Faults
        - 🔧 Switches' Faults
        - 🔧 SIM and Memory Card Faults
        - 🔧 Network Faults
        - 🔧 Restarting or Rebooting Faults
        - 🔧 PCB or Motherboard Faults
        - 🔧 Keypad faults
        - 🔧 Water Damage Faults
    - ✓ Repair Guidelines for Various Common faults
- **Preform mobile Software repair**
    - ✓ Software Repair Terminologies and Procedures
    - ✓ Requirements for the Flash Programming Process
    - ✓ Features and Components of Software Flasher Boxes
    - ✓ Software Faults Diagnosis
    - ✓ The Flash Programming Process
- **Repair report**

Resources required for the learning outcome	
Equipment	- Digital Multimeter - Power supply unit, Hot air blower - Battery booster - Microscope - Test JIG box - LCD screen tester - PCB Holder - LCD/Touchscreen Separator machine - Soldering station - Anti-static wrist trap - Anti-static mat
Materials	- Probe wires soldering tin - Soldering paste flux - Power extension cord

	• Flashing software
Tools	• Mobiles phones repair tool kit • Software repair tool (volcano box, miracle thunder box, sigma box, octoplus flasher box • MX key dongle • CS tools dongle, infinity box, Universal box)
Facilitation techniques	• Demonstration • Individual and group work • Practical exercise • Group discussion
Formative assessment methods /(CAT)	• Oral presentation • Performance assessment • Product based assessment

Integrated/Summative assessment (For specific module)

INTEGRATED SITUATION

QUICK PHONES Ltd is a mobile phone manufacturing company, located in Mutobo industrial Zone. The company deals with manufacturing competitive Telephones which feature current technologies.

The designer of QUICK PHONES Ltd has designed a new smartphone that is going to be released and all of its parts have been manufactured but not yet assembled. After reading the specifications, they found that the firmware that come with it has an old version Operating System. The company's assembly technician has resigned after getting a new job and he was the one in charge of assembling smartphones and installing their Operating Systems.

You are hired by QUICK PHONES Ltd as an assembly technician to assemble the new smartphone parts and install a latest Operating System which is compatible with the smartphone hardware.

The SOP is provided by the designer and all phone parts are provided, you have to complete this task within 5 hours.

Samsung Galaxy	STANDARD OPERATING PROCEDURE	QUICK PHONE LTD
		DOC. NO. PBY/PRD/-SOP.RWIN.001 SKD
		Date of issue of form: …./…/ 2022
		Revision: V2.1
Prepared and reviewed by: Assembly supervisor.	SMART PHONE	Qaaw
		Part Number: PNK300009
Approved by: Production manager	ASSEMBLY POST NO: XY	Description:
		Model: Samsung galaxy m33 (exynos)
Process Version: V0_2.1 /09/2022		

Process		Procedure Details in picture
No	Procedure	
1	Note: 1. All parts need to be checked and tested Check and test all system parts	

2	Note: 2. Cameras need to be connected to the main board plug the all-cameras cable to the main motherboard interface and lock the hook.	2
3	Note: 3. TOUCH SCREEN needs to be Connected to the main Board Plug the screen cable into the main motherboard interface and lock the hook.	3
4	Note: 4. charge board cable/main FPC need to be Connected to the main Board. plug the system charge board cable into the main motherboard interface and lock the hook.	4
5	Note 5, system charge board need to be connected to the main FPC Cable. Fix system charge board to the screen frame, interface and lock the hook.	5
6	Note: 6. Phone Battery need to be sticked into screen frame and Connected to the main Board. Stick the battery to the screen frame and connect to the main board interface and lock the hook.	6
7	Note 7. Speakers needed to be connected Connect speakers into back frame and connect the phone cover.	7
8	Note8. the phone device needs to be tested Test the phone device functionality	

NO	PART NUMBER	SPECIFICATION	DESCRIPTIONS	QUANTITY	TOQUE		
1	81B651-FX3000	4" SKD.SF40BA	Barebone	1	N/A		
2	80B695-FX3002	BATTERY PH-M.SF40BA..5000 MAH 2S1P	Battery	1	N/A		
3	80B690-FX3002	RAM PH-M.SF40BA	screen	1	N/A		

TOOLS	
1	Anti-static conveyor
2	Screw container
3	Automatic screw drivers

SAFETY		
1	ESD cap	
2	Electrostatic Gloves on both hands	
3	ESD Wrist	
4	Safety shoes	
5	ESD Clothes	

INSTRUCTION
Stay in Working Place
Process Should take < = To Target Time

Resources:

Equipment	▪ Soldering Station ▪ SMD Rework Station or Hot Air Blower ▪ Multimeter ▪ BGA Kit ▪ DC Power Supply

Materials/ Consumables	▪ Probe wires ▪ Soldering tin ▪ Soldering flux paste ▪ Power extension ▪ Flashing files ▪ Solder Wire ▪ Thinner or PCB Cleaner ▪ Jumper wire ▪ Ultrasonic Cleaner ▪ Telephone hardware parts
Tools	▪ SOP document ▪ Soldering Iron ▪ PCB Holder ▪ Precision Screwdriver ▪ ESD-Safe Cleaning Brush ▪ Battery Booster or Battery Eliminator ▪ Magnifying Lamp ▪ Mobile Opener ▪ DE soldering Wire ▪ LCD Tester

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation Yes	No	Marks allocation
Assemble Telephone hardware (50%)	Mobile phone model is properly identified according to the manufacturer's manual	Manufacturer is identified			1
		Model is identified			1
	Assembling Tools are appropriately identified based on phone model	Cell phones tool kit is selected			2
		ESD Tools are selected			2
		Cleaning tools are selected			1
	Mobile phones hardware parts are properly selected according to phone model	Phone cover size is identified			2
		Selected components are matching with the cover size			3
	Mobile phones hardware parts are properly assembled according to manufacturer's manual	Wi-Fi antenna is connected			2
		Front Camera module is connected			2

		Flash LED is connected			2
		Speaker is mounted			2
		Main Antenna is mounted			2
		Touch Screen is mounted			3
Deploy Telephone software (50%)	Mobile phone firmware is properly installed based on mobiles phone model.	The firmware is compatible to the telephone hardware			4
		Firmware is installed			5
	Mobile phone applications are properly installed based on installed firmware.	PDF documents can be read			3
		Word documents can be read			3
		Excel documents can be read			3
		Users can share images			3
	Mobile phone is effectively tested according to its functionalities.	Hardware part is working			2
		Software part is working			2
Total marks					50
Percentage Weightage					100%
Minimum Passing line % (Aggregate): 70%					

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List of abbreviations

AC: Alternating current

BGA: Ball Grid Array

C: Capacitor

DC: Direct current

DC: Direct Current

ESD: Electrostatic Discharge

F: Farad

IC: Collector current

IC: Integrated Circuit

K : Kilo ohm

L: Inductor

LC: Inductor-capacitor circuit

LCD: Liquid Crystal Display

LED: Light Emitting Diode

OS: Operating System

PCB: Printed Circuit Board

SMD: Surface Mount Device

SOP: Standard Operating Procedure

WIFI: Wireless Fidelity

µF: Microfarad

Ω: Ohms

Glossary

AC: Alternating current; an electric current that reverses its direction many times a second at regular intervals, typically used in power supplies.

BGA: (Ball Grid Array); A Ball Grid Array Integrated Circuit is a surface mount device (SMD) component that possesses no leads.

DC: Direct current; an electric current flowing in one direction only.

ESD: Electrostatic Discharge; is the release of static electricity when two objects come into contact. **SMD:** Surface Mount Device; is an electronic device whose components are placed or mounted onto the surface of the printed circuit board (PCB)

SOP: Standard Operating Procedure; An SOP is a procedure specific to your operation that describes the activities necessary to complete tasks in accordance with industry regulations, provincial laws or even just your own standards for running your business. Any document that is a "how to" falls into the category of procedures.