# MOBILE/SMART PHONE REPAIR ASSISTANT(SPRA)

## Core Qualification File Syllabus

**Details of Theory Syllabus – 72 hours**

| Sl. No. | CONTENT | DETAILS |
|---|---|---|
| 1. | Occupational safety (5 hrs) | 1.1. Basic safety introduction & Personal protection like use of well insulated tools, use of gloves, keeping the soldering iron in the right place unplugging equipment when not in use <br> 1.2. Basic injury prevention & elementary first aid <br> 1.3. Safety sign for Danger, Warning, caution and personal safety message <br> 1.4. Use of C type Fire extinguishers <br> 1.5. Concept of Standard safety precautions <br> 1.6. Proper disposal of electronic wastes |
| 2 | Introduction to different types of mobile cell phones (5 hrs) | 1.1 Basic Principles of Mobile Phones <br> 1.2 Study of different types of Mobile phones like <br> • Bar Phone <br> • Flip Phone <br> • Slider Phone <br> • Touch screen Phone |
| 3 | Familiarization and working principle of different parts of a mobile cell phone (20 hrs) | To Study about different parts of mobile phones like <br> • Keypad <br> • Ear piece <br> • Mouth piece <br> • Battery <br> • Power switch <br> • Power switch <br> • Oscillator <br> • Screen or display <br> • Flash IC <br> • Charging IC <br> • CPU <br> • Antenna etc. |
| 4 | Knowledge of using hardware and software tools to repair mobile cell phones (15 hrs) | To study different types of Hardware tools like <br> • Soldering Iron <br> • PCB Holder / PCB Stand <br> • different Cutters <br> • Precision Screwdriver <br> • Tweezers <br> • Brush |

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| | | ● Multimeter<br>● Hot Air Blower<br>● Battery Booster<br>● Screwdriver Kit<br>● Microscope<br>● Test JIG Box<br>● Battery Tester<br>● LCD Tester etc.<br><br>To study different types of Software tools like<br>● Tenorshare ReiBoot<br>● Phone Doctor plus<br>● All-in-one Toolbox etc. |
| 5 | Introduction and working principle of different sections of Mobile phones for assembling and disassembling purpose (12) | To study about the assembling and disassembling of different internal sections of a Mobile Phone like<br>● SIM card section<br>● Memory card section<br>● Ear Speaker Section<br>● Speaker/Ringer Section<br>● Key Backlight Section<br>● LCD Backlight Section<br>● Vibrator Motor Section<br>● Network Section<br>● Battery Charging Section<br>● FM Radio Section<br>● Bluetooth Section<br>● Hands free (Earphone) Section |
| 6 | Different types of mobile cell phone faults and to rectify them.(15) | Study to identify and to rectify Hardware faults like<br>● Battery charging faults/problems due to false charging, not charging etc.<br>● Mobile phone battery problem (faults)<br>● Network not working problem<br>● Overheating problem<br>● Sound faults<br>● Ear piece, ringer and microphone problem Lighting or LED problems<br>● Keypad problems<br>● SIM faults<br>● Wi-Fi problem<br>● internet connectivity problems<br>● Display problems<br>● Touch screen problems<br>Study to identify and to rectify Software faults like Display problems |

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|---|---|---|
| | | <ul><li>No signal message</li><li>Dead phone set</li><li>Phone on test mode Phone not charging</li><li>Phone has message to contact service provider</li><li>Phone hangs, goes off, freezes or has slow processing</li></ul> |
| **Total** | **72 hr** | |

**Detail of Practical Syllabus**

| SL NO | CONTENT | DETAILS |
|---|---|---|
| 1 | Use of different types of tools required for repairing of mobile phones (14hr) | 1.1. Soldering technique with hot air gun.<br>1.2. Desoldering technique for the removal of components from a PCB.<br>1.3. Procedure to measure resistance, voltage and current by using a multimeter for the PCB component of a mobile phone .<br>1.4. Procedure to use jumpers to bypass faulty components. |
| 2 | Fault diagnosis skill of mobile phones (14 hr) | 2.1 Identify the faulty components by cold testing method i.e to use a multimeter to check the value of resistance during powered off condition<br>2.2 Identify the faulty components by hot testing method i.e to use a multimeter to check the value of voltage during powered on condition |
| 3 | Repairing of common Mobile phone faults (48 hr) | 3.1 To rectify the intermittent faults like<ul><li>excess temperature</li><li>excess current or voltage</li><li>ionizing radiation</li><li>mechanical shock</li><li>stress or impact</li><li>contamination</li><li>mechanical stress</li><li>short circuits</li><li>imperfect connections</li></ul>3.2 To rectify the battery charging faults by<ul><li>Cleaning, re soldering or changing the charger Connector</li><li>Changing the battery and check again</li><li>Check the voltage of the battery connector using a Multimeter. The voltage should be between 1.5 and 3.7 Volts.</li></ul> |

● Checking the fuse, coil and regulator one by one and change the faulty part.

●Changing the charging IC.

●Changing the Power IC

3.3 To rectify Mobile phone battery problem (faults) by

- Checking the battery connector and charging plug
- Upgrading the software to latest version
- Checking the Mobile phone PBA current consumption or any short circuit

3.4 To rectify the network problem by

- Cleaning the antenna tips and points
- Repairing or replacing the antenna switch
- Repairing or replacing the PFO
- Repairing or replacing Network IC
- Replacing the power IC or CPU

3.5 To rectify the sound problems by checking

- the speaker and microphone
- Earpiece
- Audio and power IC
- CPU

3.6 To rectify the display problems by

- Cleaning the display tip and display connector
- De soldering the display connector
- Checking the display track
- Changing the display
- Changing the display IC and /or CPU

3.7 To rectify the LED problems by

- Checking the light setting and re soldering all the LEDs
- Checking all the LEDs with the multimeter
- Changing the light IC, power IC and display

3.8 To rectify phone touch screen faults by

- Cleaning , resoldering and/or changing the PDA tips and connectors
- Checking the track of PDA section and/or changing the PDA IC, CPU

3.9 To rectify keypad problems by

- Cleaning the keypad and keypad points
- Using the multimeter to check the row and column of keypad
- Changing keypad IC/ and or CPU

| | | 3.10 To rectify SIM problems by |
|---|---|---|
| | | ● Cleaning the SIM card tips and SIM connectors |
| | | ● By changing the SIM card, SIM IC and power IC |
| | | 3.11 To rectify software problems by |
| | | ● Removing the application software that causes problems |
| | | ● Reset the factory setting of mobile phones and update the software |
| 10 | Project | (20 hr) |
| **Total** | | **96 hr.** |

## Details of Project (20 hrs)

| Sl. No. | Content | Details |
|---|---|---|
| 1. | Project | Assembling and dis-assembling of different sections of a typical mobile phone system. |

## OUTCOMES

| Outcomes to be assessed | Assessment criteria for the outcome |
|---|---|
| 1. Apply safe Working practices | 1.1    The Assessor will ask the student about knowledge of potential hazards like burns, pricks by sharp objects, environmental pollution, trailing electrical cable etc. in the repair of mobile cell phones.<br>1.2    Students will be asked to operate a C type Fire Extinguisher.<br>1.3    Assessor will ask the student to use proper First-aid treatment.<br>1.4    Students will be demonstrated to practical use of *proper PPE kit* like antistatic mat as per norms.<br>1.5     Define different standard safety symbols |
| 2. Explain different types of mobile handsets | Assessor will ask the students about the types of  Mobile Handsets like Bar, Brick, Touch screen, Flip, Slider |
| 3. Demonstrate  the parts of a mobile cell phone | Assessor will ask the students about the different parts  of mobile phones like Keypad, Ear piece, Mouth piece, Battery, Power switch, power switch, oscillator, display, flash IC, Charging IC, CPU, Antenna etc. |
| 4. Identify and Explain use of the correct hardware and software tools to  repair  mobile  cell phones. | Assessor will ask the students about the different hardware tools like<br>●      Soldering Iron<br>●      PCB Holder / PCB Stand<br>●      different Cutters<br>●      Precision Screwdriver<br>●      Tweezers<br>●      Brush<br>●      Multimeter |

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|---|---|
| | •     Hot Air Blower<br>•     Battery Booster<br>•     Screwdriver Kit<br>•     Microscope<br>•     Test JIG Box<br>•     Battery Tester<br>•     LCD Tester etc.<br><br>Assessor will ask the students about the different software tools like<br>•     Tenorshare ReiBoot<br>•     Phone Doctor plus<br>•     All-in-one Toolbox etc. |
| 5. Know different sections of a mobile phone and Demonstrate how to assemble and disassemble those parts | Students will be asked about the assembling and disassembling of different internal Parts of a Mobile Phone like<br>•     SIM card section<br>•     Memory card section<br>•     Ear Speaker Section<br>•     Speaker/Ringer Section<br>•     Key Backlight Section<br>•     LCD Backlight Section<br>•     Vibrator Motor Section<br>•     Network Section<br>•     Battery Charging Section<br>•     FM Radio Section<br>•     Bluetooth Section<br>•     Hands free (Earphone) Section |
| 6. Identify the different types of faults that occur in cell phone and rectify them. | Students will be asked about to identify and to rectify Hardware Faults like<br>•     Battery charging faults/problems<br>•     Mobile phone battery problem (faults)<br>•     Network not working problem<br>•     Overheating problem<br>•     Sound faults<br>•     Ear piece, ringer and microphone problem Lighting or LED problems<br>•     Keypad problems<br>•     SIM faults<br>•     WiFi problem<br>•     internet connectivity problems<br>•     Display problems<br>•     Touchscreen problems<br>Students will be asked about to identify and to rectify software faults like |

|  | •     Display problems<br>•     No signal message<br>•     Dead phone set<br>•     Phone on test mode Phone not charging<br>•     Phone has message to contact service provider<br>•     Phone hangs, goes off, freezes or has slow processing |
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