

Rajasthan Skill & Livelihoods Development Corporation

1. Module Name	Mobile Repairing
2. Sector	Electronics
3. Entry Qualification	Minimum 10 th Pass
4. Minimum Age (in years)	15
5. Duration	55 days/ 330 hrs.
6. Provision of Tool kit	Yes
7. Terminal Competency	<p>After completion of training the trainee will be able to</p> <ul style="list-style-type: none"> • recall the meaning of voltage, current, resistance and electric charges; • identify the Live, Neutral and Earth on power Socket; • construct a test lamp and use it to mains; • use a tester to monitor AC power; • identify and test passive and active electronic components and different AC mains cables; • measure the gauge of the wire; • solder and de-solder various types of electrical and electronic components; • make the mains cable for termination; • test the voltages of the given cells/ battery and measure the specific gravity of the secondary battery; • use the analog and digital Multi-meter to measure the AC and DC voltage; • replace the battery in the Multi-meter; • identify different resistors, inductors, capacitors and measure their resistance, inductance and capacitance respectively; • use reference manual and identify the information required to service the electronic appliances; • diagnose faults and repair SMPS; • identify and test various parts of mobile phone; • dismantle, identify the fault and troubleshoot the given cell/ smart phone; • practice the standard troubleshooting procedure as suggested in the product manuals; • replace defective parts with new ones; and • connect internet on cell phone for browsing popular websites;
8. Registration, Inauguration, introduction and objectives of the course	
	Approx. hrs. 2

9. Course content			
Practical competencies	Approx. hrs.	Underpinning Knowledge (Theory)	Approx. hrs.
<p>Basics of electricity and electrical cables</p> <ul style="list-style-type: none"> • Practice procedure for electrical and personal safety measures • Identify the Live, Neutral and Earth on power Socket • Construct a test lamp and use it to mains healthiness • Use tester to monitor AC power. • Measure the voltage between the neutral and ground and rectify earthing • Identify and test different AC mains cables • Skin the electrical wires /cables • Measure the gauge of the wire using SWG • Make the mains cable for termination • Identify the primary and secondary cells • Measure and test the voltages of the given cells/ battery using analog and digital Multi-meter • Charge and discharge the battery • Use a hydrometer to measure the specific gravity of the secondary battery 	36	<ul style="list-style-type: none"> • Basic terms like electric charges, Potential difference, Voltage, Current, and Resistance. • Basics of AC & DC. • Terms such as positive cycle, negative cycle, Frequency, Time period, RMS, Peak value, peak to peak, instantaneous values, Insulators, conductors and semiconductor. • Different type of electrical cables and their specifications. 	10
<p>Multi-meter</p> <ul style="list-style-type: none"> • Cleaning the switch contacts using switch cleaning solution. • Testing the fuse. • Use the analog and digital Multi-meter to measure the DC voltage by doing measurement at the test points provided. • Use the analog and digital Multi-meter to measure AC voltage measurement by doing measurement at the test points provided. • Adjust the zero adjustment screw for proper zero setting with the help of a screw driver before using Multi-meter. 	30	<ul style="list-style-type: none"> • Precaution to be taken in handling an analog Multi meter. • Study of different controls on Analog Multi meter • Principle of operation of Analog Multi meter. • Precaution to be taken in handling digital Multi-meter • Frequently occurring problems in Analog multi meters and the remedial measures • Precaution to be taken in handling digital Multi-meter • Familiarization with operation controls of digital Multi-meter • Principle of operation of digital Multi-meter. 	15

<ul style="list-style-type: none"> • Replace the battery in the Multi-meter. • Replacing the open Fuse with correct rating 		<ul style="list-style-type: none"> • Frequently occurring problems in Digital multi meters and the remedial measures 	
<p>Power supply</p> <ul style="list-style-type: none"> • Testing of active components • Practice soldering and de-soldering techniques • Assemble and test-half wave, full wave & bridge rectifier circuits with and without filter. • Identify the different types of fixed positive and negative regulator ICs (78/79 series) • Identify the pins • Construct fixed voltage regulator using 78xx/79xx series ICs • Observe the output voltage of different IC regulators by varying the input voltage 	30	<ul style="list-style-type: none"> • Basic Electronics active components, testing of components • Working of half wave, full wave and bridge rectifier circuits. • Voltage Regulator circuit. • Applications of transistor – its uses • MOSFET – precautions when handling. • DIAC, SCR, TRIAC - application • Identify the pin diagram of Voltage regulator ICs 	10
<p>SMPS</p> <ul style="list-style-type: none"> • Dismantle the given SMPS and find major sections/ ICs components. • Measure voltages at vital points • Identify various input and output sockets / connectors of the given SMPS. • Repairing of SMPS, simulating various faults diagnosing and rectifying it. 	24	<ul style="list-style-type: none"> • Block Diagram of Switch mode power supplies and their working principles 	3
<p>Cell phones</p> <ul style="list-style-type: none"> • Familiarization with various tools and instruments used in mobile phone repairing. • Identify the keys and their uses. • Use of Jhatka machine (DC supply). <p>Hardware</p> <ul style="list-style-type: none"> • Dismantle, identify the parts - mic, speaker, vibrator, LCD, antenna etc. and assemble different types of cell phone/ smart phones. • Dismantle the cell phone/smart phone replace the display 	90	<ul style="list-style-type: none"> • Introduction to various types of mobile handsets, their description, features & uses of these features. • Details of various components used in mobile phones. • Use of various solders, flux and cleaning Agents • Use of antenna and antenna switch. • SIM and SIM related problems of GSM & CDMA Phones. <p>Hardware</p> <ul style="list-style-type: none"> • Introduction and study of Printed Circuit Board (Motherboard) • Names of different BGA ICs. • Work of different BGA ICs. • How to recognize various ICs. 	24

<ul style="list-style-type: none"> • Soldering and desoldering components using soldering iron. • Soldering & desoldering components using rework station. <p>Software</p> <ul style="list-style-type: none"> • Flash the various brands of cell phone/ smart phone (at least 3) • Upgrade the OS • Format the cell phone/smart phone for virus (approach the mobile repair shop) • Unlocking of handsets through codes and/or software. • Use of secret codes. • Downloading <p>Troubleshooting</p> <ul style="list-style-type: none"> • Dismantle the cell phone/smart phone remove the key pad and clean it, test for the continuity of the matrix/tracks • Testing of various parts with multimeter. • Test the battery and battery charger with Multi-meter. • Check track continuity and use jumpers for track problems. • Test and rectify the problems in antenna and antenna switch • Fault finding and troubleshooting. • Troubleshooting through schematic diagrams. • Identify the defective parts and rectify. • Working on SMD/BGA and the PCB. <p>Interface with the PC</p> <ul style="list-style-type: none"> • Interface the cell phone/smart phone to the PC and transfer the data • Connect internet on cell phone and browse popular web sites 		<p>Software</p> <ul style="list-style-type: none"> • Introduction of various software faults. • Introduction of various flasher boxes and softwares. <p>Troubleshooting</p> <ul style="list-style-type: none"> • Steps for repairing hardware and software problems. • Repairing procedure for fixing other new hardware faults. • Advanced troubleshooting techniques. • Circuit tracing, jumpering techniques and solutions. <p>Interface with the PC</p> <ul style="list-style-type: none"> • Use of computer for cell phone servicing – cell phone software Flashing and its need - precautions to be taken while flashing • Knowledge of downloading of add-on software, ring tones, wall papers, themes, etc. on non multimedia and multimedia handsets, window based handsets. 	
		<p>Support Programme</p> <ul style="list-style-type: none"> • How to start and manage your own mobile repair center. • How to successfully work as a technician. • Where to procure tools, spare parts 	6

		<ul style="list-style-type: none"> and accessories. • How to deal with customers and distributors. • Technical support and guidance. • Various other technical support websites. 	
		Entrepreneurship & Soft Skills and Computer Literacy Module:	0
		<ul style="list-style-type: none"> • Entrepreneurship – its necessity and charms of being an entrepreneur. 	1
		<ul style="list-style-type: none"> • Who is an entrepreneur and characteristics of a successful Entrepreneur? 	2
		<ul style="list-style-type: none"> • How to identify Business opportunities? 	2
		<ul style="list-style-type: none"> • Steps for setting up a small scale venture. 	1
		<ul style="list-style-type: none"> • Institutional support for entrepreneurship (whom to contact for what) 	2
		<ul style="list-style-type: none"> • Government (Central/ State) Schemes and assistance from Banks/ other financial institutions - Procedures and formalities for getting loan. 	2
		<ul style="list-style-type: none"> • How to prepare Business plan? 	2
		<ul style="list-style-type: none"> • Financial literacy-Costing, Pricing, Profitability and Break Even Analysis. 	2
		<ul style="list-style-type: none"> • Cash management in small enterprises. 	2
		<ul style="list-style-type: none"> • Accounting and Book Keeping 	2
		<ul style="list-style-type: none"> • Introduction to Taxation 	1
		<ul style="list-style-type: none"> • Shop and Establishment Act and its provisions. 	1
		<ul style="list-style-type: none"> • Creativity, Problem solving & decision making. 	1
		<ul style="list-style-type: none"> • Common mistakes generally made by entrepreneurs. 	1
		<ul style="list-style-type: none"> • Interaction with successful entrepreneur and success stories. 	2
		<ul style="list-style-type: none"> • Communication and Negotiation skills. 	1
		<ul style="list-style-type: none"> • Interpersonal skills 	1
		<ul style="list-style-type: none"> • How to Deal with customer attitude – Effective selling. 	1
		<ul style="list-style-type: none"> • Marketing – Basic concepts/ Skills and effective mode of advertising. 	1
		<ul style="list-style-type: none"> • Introduction to e-commerce. 	2

Computer Fundamentals Customize the Desktop Environment e.g. Desktop, Start Menu, and Taskbar etc. Configuring & Migrating Files, Folders & Settings - Folder Views, Accessibility Settings	2	Computer Fundamentals, MS-Office & Internet introduction to Computers History of Computers Components of Hardware Peripherals	1
MS Word Creating, Organizing & Formatting Content Collaborating – Merge, Insert, View, Edit, Track Mode etc. Formatting & Managing Documents	4	Concept of Operating System – Windows XP, Exploring & Configuring the Windows XP Desktop Environment-Customize the Desktop, Start Menu, and Taskbar etc. Configuring & Migrating Files, Folders	1
MS Excel Creating, Analyzing & Formatting Data & Content Collaborating - Insert, View, Edit etc. Managing Workbooks	3	Settings - Folder Views, Accessibility Settings Features of Windows XP Understanding concepts of Word processing using MS-Word Understanding concepts of Electronic spreadsheet and various types of entries in it	1
MS PowerPoint Creating & Formatting Content Collaborating - Track, Edit, Add, Delete Comments, Merge Managing & Delivering Presentations	3		
Internet Concepts Opening websites and downloading data Writing, reading and sending emails	4	Understanding concepts of URL Creating and Opening an E-mail account. Receiving and sending emails Searching information on Internet.	1
Approx. Total Practical hours	226	Approx. Total Theory hours	102
Grand Total (2+226+102)			330

10. Tools, Equipments and Material for a batch of 30 trainees		
S.No.	Item	Quantity
1	Technicians tool kit	30 Nos.
2	Screw drivers assorted size and shapes (TROX) for cell phones	15 sets
3	Digital Multi-meter	15 Nos.
4	Analog Multi-meter	6 Nos.
5	Clip on ammeter	As Required
6	Soldering iron	15 Nos.
7	De soldering pump	15 Nos.
8	Soldering / de soldering temp controlled station	6 Nos.
9	SMD soldering tools	6 Nos.
10	BGA soldering kit	1 No.
11	Cell phones latest (CDMA & GSM) & smart phone	15 each
12	Table lamp	15

13	Electrical and Electronic accessories	As required
14	Jhatka Machine (DC supply)	1 No.

Note: In case any particular tool/equipment has appeared more than once in the tool and equipment list given above, please ignore the same.

S.No.	Item	Quantity	S.No.	Item	Quantity
	Hardware			Software:	
1	Computers/Laptops	10 (one for three trainee)	6	Microsoft Windows 7/8/10 or UNIX/ LINUX or latest software	For all Systems
2	Power backup	For all Systems	7	Microsoft Office 2007/ 2010/ 2013 or latest software	For all Systems
3	Inkjet/Laser Printer (Network/USB Printer)	1	8	Antivirus Software (TVD/ Norton/ Quick Heal Total Security/ Kaspersky/ Any Popular brand)	For all Systems
4	Speaker	1	9	Internet Connection	For all Systems
5	Spare H/W components	As per requirement			