Rajasthan Skill & Livelihoods Development Corporation

1. Module Name	**Installation & Maintenance of Electronic Equipments in Cell Phone Towers**
2. Sector	Electronics
3. Entry Qualification	Minimum 10th Pass
4. Minimum Age (in years)	15
5. Duration	**69 days/ 414 hrs.**
6. Provision of Tool kit	Yes
7. Terminal Competency	**After completion of training the trainee will be able to** • use multimeter; • test active and passive components, transformers and semiconductors; • undertake soldering and de soldering of components; • assemble and test rectifier circuits, amplifier circuits and audio power amplifier; • install and maintain UPS and inverter; • charge and test batteries; • check and maintain power supply; • recall feeder cables, ladders, Base Transceiver Station (BTS), Transmission Rack (TMR) etc. and their use; • carry out cable earthing; • make feeder connector; • install indoor and outdoor ladder; • install antenna; • measure signal strength; • interconnect different units in a Base Transceiver Station (BTS); • install and Maintain Generator Set, UPS; and • install and Maintain Base Terminal Station.

	Approx. hrs.
8. Registration, Inauguration, introduction and objectives of the course	2

9. Course content

Practical competencies	**Approx. hrs.**	**Underpinning Knowledge (Theory)**	**Approx. hrs.**
• Practice procedure for electrical and personal safety measures.	2	• Electrical and personal safety, dangers and preventions.	1
• Use of multimeter.	2	• Multimeter and its various application.	1
• Testing of active and passive components.	3	• Basics of electricity – define DC, AC// Practical measuring units of voltage, current, resistance. • Types of transformers – its construction, testing.	3
• Testing of transformers.	3	• Testing of proper earth using test lamp.	1

• Testing of semiconductor components.	3	• Testing of earth using multimeter.	2
• Testing of unregulated and regulated voltages.	3	• Fuse – Types, use of fuses and its rating.	2
• Soldering and de-soldering techniques.	6	• Basic Electronics – passive and active components – testing of components, MOSFET – precautions when handling.	3
• Assemble and test rectifier circuits – half wave, full wave & bridge rectifier.	6	• Application of transistor – its uses.	2
• Assemble a power amplifier circuit (common emitter, emitter follower).	9	• Op-Amp – Introduction, applications, constructions, comparators.	2
• Assemble and test an audio power amplifier (buzzer).	9	• Voltage Regulator and their types.	2
• Construct a RC – oscillator and test it.	9	• DIAC, SCR, TRIAC – application.	2
• Find the total load and select a suitable UPS/ Inverter (rating factor).	3	• Digital Electronics – gates and its application, multiplexers, de-multiplexers, counter.	3
• Installation of UPS and Inverter.	6	• Electrical load their VA and watts. • Various types of batteries used in UPS and inverters and their maintenance.	3
• Maintenance of Battery.	3	• Single phase and three phase system, different types of inverter, UPS, Working principle, specifications, explanation with the help of block diagram, basic principle of working of power switches, testing methods, discussions of various faults, diagnosing methods, rectifying common faults.	6
• Opening & dismantling an equipment and identifying the major parts, testing of major components, identifying transformers and checking, checking of power modules, Charging, discharging and testing of batteries, repairing of SMPS, simulating various faults diagnosing and rectifying it.	18		
• Practice procedures for safety and health hazards measures.	3	• Electrical and personal safety, dangers and preventions.	1
• Perform cable earthing • Feeder cable clamping • Feeder connector making • Install indoor and outdoor ladder • Cable routing • Install equipment like BTS, TMR • Install antenna	84	• Feeder Cables – earthing, clamping, connector • Ladders used – installation of indoor and outdoor ladders • Base Transceiver Station (BTS) – INSTALLATION • Installation of Transmission Rack (TMR) • Equipment Installation and safety • Installation of Antenna	24

• Install the GSM & MINILINK antenna • Use VSWR meter and measure the signal strength • Perform Microwave alignment • Perform the task of interconnecting the different units in a Base Transceiver Station	102	• Fundamentals of AC • Microwave spectrum – CDMA, GSM – micro wave link – wave guide • Modem multiplexing unit • Switching Multiplexing Unit • Tributary Frame • Distribution Unit • Mini link cable and installation • Antenna – mini-link & serving antenna, antenna maintenance • UPS and its maintenance • Generator set and its Maintenance • Lighting arrestor • Electrical wiring, cabling and routing	30
		Entrepreneurship & Soft Skills and Computer Literacy Module:	0
		• Entrepreneurship – its necessity and charms of being an entrepreneur.	1
		• Who is an entrepreneur and characteristics of a successful Entrepreneur?	2
		• How to identify Business opportunities?	2
		• Steps for setting up a small scale venture.	1
		• Institutional support for entrepreneurship (whom to contact for what)	2
		• Government (Central/ State) Schemes and assistance from Banks/ other financial institutions - Procedures and formalities for getting loan.	2
		• How to prepare Business plan?	2
		• Financial literacy-Costing, Pricing, Profitability and Break Even Analysis.	2
		• Cash management in small enterprises.	2
		• Accounting and Book Keeping	2
		• Introduction to Taxation	1
		• Shop and Establishment Act and its provisions.	1
		• Creativity, Problem solving & decision making.	1
		• Common mistakes generally made by entrepreneurs.	1
		• Interaction with successful entrepreneur and success stories.	2

		• Communication and Negotiation skills.	1
		• Interpersonal skills	1
		• How to Deal with customer attitude – Effective selling.	1
		• Marketing – Basic concepts/ Skills and effective mode of advertising.	1
		• 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	**290**	***Approx. Total Theory hours***	**122**
		Grand Total (2+290+122)	**414**

10. Tools, Equipments and Material for a batch of 30 trainees		
S.No.	**Item**	**Quantity**
1	Inverter / UPS Trainer	1
2	Battery Charger	1
3	Technicians tool kit comprising of all tools required in repair and maintenance of Basic electronic items	6
4	Digital multi meter	6

5	Soldering / De-soldering temp controlled station	6
6	Clip on ammeter	6
7	Soldering gun	6
8	De-soldering Pump	6
9	SMD Soldering tools	6
10	Antistatic mat with proper grounding and wrist band	As required
11	Multimeter	6
12	Altimeter	6
13	GPS meter	3
14	Binocular	3
15	VSWR Meter	3
16	M4 crimping tool	6
17	BNC crimping tool	6
18	SMZ crimping tool	3
19	Maintenance tool kit comprising of spanners, screw drivers etc.	6
20	Clamp meter	3

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/ Nortan/ 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			