

Detailed Syllabus
For
Electronics Equipment Repair & Maintenance
To
Improve the employability of the rural youth
belonging to SC/ST & Minority communities



DOEACC Society
An Autonomous Scientific Society of Department of Information Technology
Ministry of Communications and Information Technology
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1. Certificate Course in Integrated Electronics and computer Services

Objective of the Course

This course has been designed to provide an introduction to Computer Hardware & maintenance. The student will be able to troubleshoot problems of PC and replace the defected parts of the computer.

At the end of the course the students will be having knowledge of: -

- Knowledge of Computer & its peripherals.
- Fundamentals of troubleshooting,
- Operating systems,
- Modems & Internet,
- PC Repair & maintenance

Outline of Course

S. No.	Topic	Hours	
		Theory	Practical/ Tutorial
1.	Introduction to Basic Electronics	03	03
2.	Electronic and Electrical components	05	05
3.	Introduction to PC components	03	03
4.	Soldering/ de- soldering techniques	02	02
5.	Tools and Techniques	01	01
7.	Trouble shooting of Peripherals, H/W	02	02
8.	Repair and maintenance of PCs and Peripherals	05	05
9.	Installation of network equipments	03	03
10.	Trouble shooting of Internet connection	03	03
11.	Trouble shooting, S/W	04	04
12.	Maintenance, Installation of Windows & other S/W	05	05
	TOTAL	36	36

Detailed Syllabus

1. Introduction to Basic Electronics

03Hrs.

Hour	Topic
1 st	Material for electronics application; Conductor, Insulator and Semiconductor
2 nd	Holes and electronics in semiconductor

3 rd	Intrinsic and Extrinsic semiconductor
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2. Electronic and Electrical components 05Hrs.

Hour	Topic
1 st	Passive and active components
2 nd	Resister, Capacitor and Inductor
3 rd	Semiconducting devices; Diode
4 th	Transistor, ICs
5 th	Connector, Relays, Switches and Pannel components

3. Introduction to PC components 03Hrs.

Hour	Topic
1 st	SMPS, Monitor; CRT Construction
2 nd	FDD, Keyboard, HDD
3 rd	Semiconducting Memories, Printer, Microprocessor

4. Soldering/ de- soldering techniques 02Hrs.

Hour	Topic
1 st	Soldering Iron, Soldering wire, Soldering Flux, Soldering method, Zero defect soldering
2 nd	Desoldering pump, Temperature controlled soldering station, Hands-on-practices of Soldering

5. Tools and Techniques 01Hrs.

Hour	Topic
1 st	Tools for repairing of electronic equipments; Combination pilar, Nose pilar, Wire stripper cum Cutter, Twizzer, Screw Driver set.

6. Trouble shooting of Peripherals, H/W 02Hrs.

Hour	Topic
1 st	BIOS, POST & DOS batch files
2 nd	Back up procedure & Disaster preparation

7. Repair and maintenance of PCs and Peripherals 05Hrs.

Hour	Topic
1 st	Assembly and Disassembly of PCs and its various parts
2 nd	Start up problem, run problem, Identification and remedy
3 rd	Problems of keyboard, display, printer, FDD, HDD, CDD, SMPS, their identification and remedy

4 th	Problems of Motherboard, identification and remedy, Servicing and troubleshooting of Mouse and Keyboard
5 th	Maintenance of UPS

8. Installation of network equipments 03Hrs.

Hour	Topic
1 st	Introduction to Network, Media and Connectors
2 nd	Networking Devices, NIC, Repeater, Hub and its types
3 rd	Bridges and their types, Switches, Router, Network model

9. Trouble shooting of Internet connection 03Hrs.

Hour	Topic
1 st	Networking topology, Transmission media and method of communication
2 nd	Cabling: Straight through and cross over Cable, Wifi router, communication protocol
3 rd	TCP/IP, IP addressing, MAC address, subnetting, troubleshooting network problem

10. Trouble shooting, S/W 04Hrs.

Hour	Topic
1 st	Installation of software packages such as MS Office etc,
2 nd	Backup and Restore operation, Compression Utilities: WinZip, PKZip
3 rd	Concept of compression, defragmenting, Hard disk, using defrag, scan disk for checking disk space, lost files and recovering
4 th	Formatting HDD, Antivirus packages, CD writing, software- Nero etc

11. Maintenance, Installation of Windows & other S/W 05Hrs.

Hour	Topic
1 st	Windows XP basics; Introduction, objective , feature of Windows XP
2 nd	Windows XP installation, preparation before installation, performing a clean installation
3 rd	Windows XP security feature, user account
4 th	Vista; Introduction, getting started with windows vista, automating vista
5 th	Interfacing Windows and Hardware, Windows 7; Discovering the new features, Installing Windows 7

List of Equipments / Components for Practical

S. No.	Particulars
1.	Resistance of different value and Wattage ratings
2.	Capacitor of different types
3.	Transistors – BC 546, BC 547, SL 100, 2N3055
4.	Rectifier Diode
5.	Zener Diode of different values
6.	Step down Transformers of different ratings
7.	LED of different colours
8.	3 Pin Voltage Regulators
9.	Logic GATE ICs
10.	Tool Kit
11.	Digital Multimeter
12.	CRO
13.	Soldering Iron
14.	Solder Wire
15.	Soldering Flux
16.	Desoldering Pump
17.	Mother Board
18.	PC
19.	Floppy Drive
20.	Scanner
21.	U TP Cable
22.	RJ 45 Connector
23.	Crimping Tools
24.	Hard Disks
25.	Printers
26.	8 Port HUB
27.	Windows XP, Vista, Windows 7 & Anti Virus S/W
28.	Blank CD
29.	Blank DVD
30.	Blank CD R/W

2. Certificate Course in Repair & Maintenance of Power conditioning Equipment

Objective of the Course

This course has been designed to provide an introduction to repair and maintenance of power conditioning equipment such as stabilizer, CVT, Inverter and battery.

At the end of the course the students will be having knowledge of: -

- Electronic Components
- Test and Measuring instruments
- Repair and maintenance of
 - stabilizers
 - CVT
 - Inverter and battery

Outline of Course

S. No.	Topic	Hours	
		Theory	Practical/ Tutorial
1.	Electronic Components	08	08
2.	Mechanical and electromechanical components used in Electronic Equipment	03	03
3.	Test and Measuring Instruments	04	04
4.	Tools and Aids	01	01
5.	Soldering/ de- soldering Technique	02	02
6.	Trouble shooting Techniques	03	03
7.	Stabilizers and CVT	05	05
8.	Inverter	05	05
9.	Battery	05	05
TOTAL		36	36

Detailed Syllabus

1. Electronic Components

08

Hrs.

Hour	Topic
1 st	Introduction to electronic component, passive and active components
2 nd	Resistor, Capacitor and Inductor, their identification, types and application

3 rd	Transformer, working principle, classification, types and application
4 th	Semi conducting devices: Diode, its type, characteristics and applications
5 th	Transistor, Bipolar & MOS family characteristics and applications
6 th	Analog ICs, 555 timer, IC741, characteristics of 741
7 th	Digital ICs, ICs for logic gates, Truth table verification of logic gates
8 th	Design and realization of simple circuits using 741, inverting amplifier, non-inverting amplifier, voltage follower, etc.

2. Mechanical and Electromechanical Components used in Electronic Equipment

03 Hrs.

Hour	Topic
1 st	Switches, their types, Mechanical Electromechanical & Electronic Switch
2 nd	Diode & Transistor as a Switch, characteristics of Switches, performance of Switch
3 rd	Connector & Relays, their types and application, panel components

3. Test and Measuring Instruments

04 Hrs.

Hour	Topic
1 st	Basics of Multimeter, Analog and Digital Multimeter, Measuring current & Resistance with Multimeters
2 nd	Cathode ray Oscilloscope; Viewing Signal with CRO, Measurement of frequency, time period and voltage with CRO
3 rd	Block Diagram of CRO, CRT, Construction, Deflection Mechanism
4 th	Function Generator; Generating Signals with Function Generator, Specification of function Generator

4. Tools and Aids

01 Hrs.

Hour	Topic
1 st	Tools used for repairing of electronics equipments, combination pillar, Nose pillar, Wire Stripper cum Cutter, Twizzer, Screw Driver set

5. Soldering/ de- soldering Technique

02 Hrs.

Hour	Topic
1 st	Soldering Iron, Soldering wire, Soldering Flux, Soldering methods,

	Zero defect soldering
2 nd	Desoldering pump, Temperature controlled soldering station, Hands-on-practices of Soldering

6. Trouble shooting Techniques 03 Hrs.

Hour	Topic
1 st	Basic troubleshooting method, Getting into troubleshooting, selected instruments for troubleshooting
2 nd	Measurement techniques in troubleshooting, support services for troubleshooting
3 rd	General Safety Consideration, Safety Guidelines for High Voltage and/or line powered equipments, Practical troubleshooting problems.

7. Stabilizers and CVT 05 Hrs.

Hour	Topic
1 st	Need of stabilizer, working principle, types of stabilizer
2 nd	Autocut and automatic stabilizer, Servo Stabilizer, Study of Control Circuit of Stabilizer
3 rd	Transformer employed in stabilizer, multiwinding/multitaped transformer
4 th	Introduction to Constant Voltage transformer, General Circuit diagram of CVT, Working principle of CVT
5 th	EMI/RFI filter, Surge Suppressor, Repairing of CVT

8. Inverter 05 Hrs.

Hour	Topic
1 st	Introduction to Inverter, Block diagram of Inverter
2 nd	Rectifier, its type and working principle, PIV of Diode, Filter employed in rectifier
3 rd	Battery charger circuit, working of Inverter
4 th	Oscillator, type of Oscillator, Square wave Generator
5 th	PWM, DC to AC Converter/Inverter, Designing an inverter, Circuit using PWM

9. Battery 05 Hrs.

Hour	Topic
1 st	Battery types, Primary Cell, Secondary Cell, Wet- charged, Dry-charged, Low maintenance
2 nd	Construction of Battery, Case Cover plates, Separator, Cells, Electrolyte, etc.
3 rd	Lead Acid battery, Electrochemical reaction, Ni-CD battery,

	charging/discharging of battery
4 th	Capacity rating, CCA, RC, AH & Power(watt)
5 th	Factor affecting charging, Cause of battery failure, diagnosis and testing, visual inspection, Heavy load test

List of Equipments / Components for Practical

S. No.	Particulars
1.	Resistance of different value and Wattage ratings
2.	Capacitor of different types
3.	Transistors – BC 546, BC 547, SL 100, 2N3055
4.	Rectifier Diode
5.	Zener Diode of different values
6.	Step down Transformers of different ratings
7.	LED of different colors
8.	3 Pin Voltage Regulators
9.	Digital & Linear ICs
10.	Tool Kit
11.	Digital Multimeter
12.	CRO
13.	Soldering Iron
14.	Solder Wire
15.	Soldering Flux
16.	DC Ameter 5 Amp
17.	AC Ameter 5 Amp
18.	SMPS
19.	Battery Charger
20.	CVT 500VA
21.	Inverter 650 VA
22.	Stabilizer with Auto Cut

3. Certificate Course in Maintenance of home appliances

Objective of the Course

This course has been designed to provide the knowledge of Repairing and Maintenance of home appliances. Students will be familiar with maintenance of everyday household necessities.

At the end of the course the students will be having knowledge of: -

- Observing the safety precautions while working,
- Test line cord for continuity with test lamp/ multimeter,
- Dismantle and reassemble an electric iron,
- Heater, kettle, room heater, toaster, hair dryer, mixer grinder etc.,
- Install a ceiling fan and the regulator,
- Check a fluorescent lamp chock, starter and install it,
- Domestic installation testing before energizing a domestic installation.

Outline of Course

S.No.	Topic	Hours	
		Theory	Practical/ Tutorial
1.	General safety & electrical safety	04	04
2.	Crimping & crimping tool, soldering	04	04
3.	Introduction to electricity	03	03
4.	Earthing & types of earthing	04	04
5.	Simple house wiring circuit	03	03
6.	Install, service and repair of automatic electric iron, mixer grinder, ceiling and table fan, heater, iron, kettle, washing machine etc	05	05
7.	Assemble and install of a fluorescent lamp	03	03
8.	Thermostat heat controls of Automatic electric iron, steam iron, spray irons	04	04
9.	Maintenance of decorative serial lamp for a required supply voltage	03	03
10.	Introduction to re- winding Insulating material used	03	03
	TOTAL	36	36

Detailed Syllabus

1. General safety & electrical safety

04Hrs.

Hour	Topic
1 st	What is safety, Why safety is needed
2 nd	Tools for electrical safety
3 rd	Precaution during maintenance of home appliance maintenance, safety rules

4 th	Precaution during electrical maintenance
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2. Crimping & crimping tool, soldering 04Hrs.

Hour	Topic
1 st	What is crimping, crimping tool, How to use
2 nd	RJ-11 connector, telephone wire, UTP Cable
3 rd	crimping technique, precaution during crimping
4 th	Soldering Iron, Soldering wire, Soldering Flux, Soldering method, Zero defect soldering

3. Introduction to electricity, 03Hrs.

Hour	Topic
1 st	Electric charge, Voltage, electric current
2 nd	Definition of Electric, Electric Field
3 rd	Ohm's Law, Electric Potential, Cell, Electronic Circuit

4. Earthing & types of earthing 04Hrs.

Hour	Topic
1 st	Introduction of Earthing
2 nd	Need of earthing, Hazard
3 rd	Types of earthing
4 th	Advantage of earthing, working of earthing

5. Simple house wiring circuit 04Hrs.

Hour	Topic
1 st	Introduction of Wiring
2 nd	types of wiring, need of wiring, advantage of wiring
3 rd	wiring methods
4 th	electrical panel, cable type

6. Install, service and repair of automatic electric iron, mixer grinder, ceiling and table fan, heater, iron, kettle, washing machine etc. 05Hrs.

Hour	Topic
1 st	Installation procedure of electric iron, mixer grinder
2 nd	Installation procedure of ceiling and table fan, heater, iron, kettle, washing machine
3 rd	Working of Ceiling and Table Fan
4 th	circuit description, fault finding
5 th	removal of faulty component in electric iron, mixer grinder, ceiling and table fan, heater, iron, kettle, washing machine

7. Assemble and install of a fluorescent lamp**03Hrs.**

Hour	Topic
1 st	Parts of fluorescent lamp
2 nd	Working principle of fluorescent lamp
3 rd	assembling procedure of fluorescent lamp

8. Thermostat heat controls of Automatic electric iron, steam iron, spray irons.**04Hrs.**

Hour	Topic
1 st	Thermostat, Bimetal, Wax Pallet
2 nd	Gas Expansion, Pneumatic
3 rd	Bimetallic Switching thermostat, Simple two wire thermostats
4 th	Combination heating/Cooling regulation, Heat Control of Steam Iron, Electric Iron

9. Maintenance of decorative serial lamp for a required supply voltage 03Hrs.

Hour	Topic
1 st	What is decorative lamp, Working of decorative lamp
2 nd	Description of decorative serial lamp
3 rd	Maintenance of decorative serial lamp

10. Introduction to re- winding Insulating material used**03Hrs.**

Hour	Topic
1 st	Material, Types of Material
2 nd	Insulating Material, Types of Insulating Material
3 rd	Need of insulating material, winding, re-winding

List of Equipments / Components for Practical

S. No.	Particulars
1.	Digital Multimeter
2.	CRO
3.	Soldering Iron
4.	Solder Wire
5.	Solder Flux
6.	Desoldering Pump
7.	Desoldering Wire
8.	Project Board

9.	Multi Stand Connecting Wire
10.	Single Stand Connecting Wire
11.	General Purpose PCB
12.	Heater, Kettle, Room heater, toaster, hair dryer, mixer grinder
13.	Ceiling Fan Set
14.	Fluorescent Lamp
15.	Fluorescent chock and starter
16.	Washing Machine
17.	Automatic Iron
18.	Steam Iron
19.	Spray Iron

4. Certificate Course in Emergency Light and Solar Lantern

Objective of the Course

This course has been designed to provide an introduction to repair and maintenance of Solar Lantern, Solar Panels and Emergency Light.

At the end of the course the students will be having knowledge of: -

- Working principle and Repairing and maintenance of Solar Lantern,
- Battery,
- Solar Panels
- Emergency Light

Outline of Course

S.No.	Topic	Hours	
		Theory	Practical/ Tutorial
1.	Introduction to Basic Electronics	10	10
2.	Trouble shooting Tools and Equipments	02	02
3.	Working principle of Emergency lights	04	04
4.	Working principle of Solar Lantern	04	04
5.	Battery	06	06
6.	Solar Panels	02	02
7.	Repair and maintenance of Emergency Light and Solar Lantern	08	08
	TOTAL	36	36

Detailed Syllabus

1. Introduction to Basic Electronics

10 Hrs.

Hour	Topic
1 st	Introduction to Electronics, Types of Material
2 nd	Intrinsic Semiconductor, Extrinsic Semiconductor
3 rd	Semiconductor, N-Type Semiconductor, P-Type Semiconductor, Conductivity of N-Type and P-Type Semiconductor
4 th	Charge on N-Type and P-Type Semiconductor, Majority and Minority carrier in Semiconductor
5 th	PN-Junction, Properties of PN junction
6 th	Applying voltage across PN-junction, Current Flow in PN junction
7 th	V-I characteristics of PN- junction
8 th	Semiconductor diode, Working of diode, specification of diode
9 th	Active and Passive component, Testing, Identification, Properties
10 th	Rectifier Circuit, Measurement of Voltage, Current and resistance power supply

2. Trouble shooting Tools and Equipments

02 Hrs.

Hour	Topic
1 st	Introduction to Multimeter, Oscilloscope, Soldering/desoldering station, vaccum cleaner, brush, forceps, screw driver set, cutter, pliers, soldering iron, soldering iron, soldering wire, desoldering pump
2 nd	Soldering Wire Solution, Soldering flux solution, clearing solution, soldering and Desoldering technique

3. Working principle of Emergency lights

04 Hrs.

Hour	Topic
1 st	Introduction to Emergency Light, Charger Circuit
2 nd	Working of Tube Light used in Emergency Light
3 rd	Inverter circuit used in Emergency Light
4 th	Change over circuit, change over time, component used in change over circuit

4. Working principle of Solar Lantern

04 Hrs.

Hour	Topic
1 st	Introduction to Solar, Solar Devices
2 nd	Introduction Solar Lantern, CFL for Solar Lantern
3 rd	Control Circuit, Sensor Circuit
4 th	Voltage Controller Circuit, Charge Circuit

5. Battery**06 Hrs.**

Hour	Topic
1 st	Introduction to Battery, types of Battery
2 nd	Principle of Cell, Charge on Cell
3 rd	Charging and discharging of Battery
4 th	Lead-Acid Battery
5 th	Maintenance free battery
	Preventive maintenance of Battery

6. Solar Panels**02 Hrs.**

Hour	Topic
1 st	Element of Solar Light
2 nd	Working of Solar panel

7. Repair and maintenance of Emergency Light and Solar Lantern**08 Hrs.**

Hour	Topic
1 st	Troubleshooting techniques
2 nd	Fault Finding
3 rd	Precaution during fault finding
4 th	Fault diagnosis of Emergency Light
5 th	Fault diagnosis of Solar Lantern
6 th	Removing faulty component in Emergency Light
7 th	Removing faulty component in Solar Lantern
8 th	Safety Precaution, Preventive maintenance of emergency light and Solar Lantern

List of Equipments / Components for Practical

S. No.	Particulars
1.	Digital Multimeter
2.	CRO
3.	Soldering Iron
4.	Solder Wire
5.	Solder Flux
6.	Desoldering Pump
7.	Desoldering Wire
8.	Project Board
9.	Multi Stand Connecting Wire
10.	Single Stand Connecting Wire
11.	General Purpose PCB
12.	Battery Charger

13.	Emergency Light
14.	Solar Lantern with Solar Panel
15.	Lead-Acid Battery

5. Certificate Course in Telephonic Equipment Maintenance

Objective of the Course

This course has been designed to provide an introduction to Telephonic Equipment maintenance. The student will be able to troubleshoot problems of Telephonic Equipment.

At the end of the course the students will be having knowledge of: -

- H/W & S/W Troubleshooting of telephonic equipments
- Maintenance of Telephone sets

Outline of Course

S.No.	Topic	Hours	
		Theory	Practical/ Tutorial
1.	Introduction to Handsets	07	07
2.	Working Principle	08	08
3.	Components used in handsets	07	07
4.	Tools and equipments use for Repairing and maintenance of telephone Handsets	05	05
5.	Troubleshooting techniques regarding transmission, reception, volume control, charger, battery etc	09	09
TOTAL		36	36

Detailed Syllabus

1. Introduction to Handsets

07Hrs.

Hour	Topic
1 st	Communication Through Telephone System, Introduction to handset
2 nd	Basic concept of Telephone N/W, Public Switched Telephone Network(PSTN)
3 rd	PSTN Operators, Technology in PSTN, Description of telephone Instrument
4 th	Types of cell phone set
5 th	Decadic cell phone set
6 th	DTMF cell phone set
7 th	Business and Home Telephone System

2. Working Principle

08Hrs.

Hour	Topic
1 st	An overview on Operating Principle, Subscriber loop
2 nd	Block diagram of Telephone Operations, Dialing, signaling tones
3 rd	Block Diagram of Telephone set

4 th	Dialer Section and it's configuration
5 th	Speech Section and it's configuration
6 th	Ringer Section and it's configuration
7 th	Polarity reversal
8 th	protection circuit and it's working

3. Components used in handsets

07Hrs.

Hour	Topic
1 st	Surge protector
2 nd	Hook switch, Buzzer
3 rd	Microphone, Speaker, Dialer IC
4 th	Ringer IC, Speech IC
5 th	Basic electronic component
6 th	Introduction to Register and Capacitor and their types
7 th	Introduction to Diode, Transistor and their types

4. Tools and equipments use for Repairing and maintenance of telephone Handsets.

05 Hrs.

Hour	Topic
1 st	Multimeter, Soldering station
2 nd	Desoldering station, cutter
3 rd	Nose Pliers
4 th	Screw Driver set, Solder Wire
5 th	Tweezers, Different Types of Tweezers

5. Troubleshooting techniques regarding transmission, reception, volume control, charger, battery etc.

09 Hrs.

Hour	Topic
1 st	Transmission: Coil card terminator
2 nd	speech IC and related circuit, Microphone
3 rd	Reception: Coil card terminator
4 th	speech IC and related circuit
5 th	Speaker Volume Control: Ringer IC O/O voltage and related circuit for short circuit
6 th	dry connection and component failure
7 th	Buzzer
8 th	Charger: connecting lead
9 th	Charger circuit

List of Equipments / Components for Practical

S. No.	Particulars
1.	Resistance of different value and Wattage ratings
2.	Capacitor of different types
3.	Transistors – BC 546, BC 547, SL 100, 2N3055
4.	Rectifier Diode
5.	Zener Diode of different values
6.	Step down Transformers of different ratings
7.	LED of different colours
8.	3 Pin Voltage Regulators
9.	Logic GATE ICs
10.	Tool Kit
11.	Digital Multimeter
12.	CRO
13.	Soldering Iron
14.	Solder Wire
15.	Soldering Flux
16.	Microwatt Soldering Iron
17.	Desoldering Station
18.	Desoldering Pump
19.	Project Board
20.	Hot Air Gun
21.	Telephone Trainer Kit
22.	Microphone
23.	Speaker
24.	Telephone Set of different make
25.	Multi-stand Connecting wire
26.	Single stand connecting wire
27.	Coil Card
28.	Dialer IC ,Ringer IC, Speech IC
29.	Buzzer
30.	Telephone Set Connecting lead
31.	RJ-11 junction Box
32.	Crimping Tool for RJ-45 and RJ-11 Connector

6. Certificate Course in Mobile Maintenance

Objective of the Course

This course has been designed to provide an introduction to Mobile maintenance. The student will be able to troubleshoot problems of Mobile equipments.

At the end of the course the students will be having knowledge of:-

- Working of Mobile Sets
- Components used in Mobile Sets
- H/W & S/W Troubleshooting of Mobile
- Maintenance of Mobile sets

Outline of Course

S.No.	Topic	Hours	
		Theory	Practical/ Tutorial
1.	Types of Mobile Handsets	06	06
2.	Working Principle	06	06
3.	Components used in Mobile handsets such as SIM Card, Battery, Memory etc	06	06
4.	Tools and equipments use for Repairing and maintenance of Mobile Handsets	06	06
5.	Software applications for troubleshooting of Mobile sets	04	04
6.	Troubleshooting techniques regarding display, transmission, reception, volume control, charger, Battery etc	08	08
TOTAL		36	36

Detailed Syllabus

1. Types of Mobile Handsets

06Hrs.

Hour	Topic
1 st	Introduction to Mobile Phone Technology, Concept of Mobile Phone
2 nd	Types of Mobile Phone Technology, 1 st Generation, 2 nd Generation Technology
3 rd	3 rd Generation , 4 th Generation Technology, Introduction to the GSM standard
4 th	Architecture of the GSM network
5 th	Concept of Cellular Network, Communication Through Cellular Network
6 th	Introduction to the CDMA standard

2. Working principle**06Hrs.**

Hour	Topic
1 st	Basic concept of mobile network
2 nd	Basic Unit, Mobile Network Capabilities
3 rd	Mobile unit, Cellular Telephone Unit
4 th	Mobile Switching Centre, Call Processing, Operation and Maintenance Support
5 th	Home area and Roaming, Handoff
6 th	Description of Mobile set, Basic CKT Board

3. Components used in Mobile handsets such as SIM Card, Battery, Memory etc.**06Hrs.**

Hour	Topic
1 st	SMD Components, SIM card, SIM card socket, switch
2 nd	Antenna Interface, N/W IC
3 rd	Speech IC, Power IC
4 th	Power amplifier module, CPU, RAM
5 th	LCD Module, Speaker
6 th	Microphone, Battery, Battery Charger

4. Tools and equipments use for Repairing and maintenance of Mobile Handsets.**06Hrs.**

Hour	Topic
1 st	Screw Driver Set for mobile phone
2 nd	Tweezers, Different Types of Tweezers, Nose Pliers
3 rd	Microwatt soldering station
4 th	Hot air gun, Multimeter
5 th	Liquid solder pest, Magnifying Lamp and Measuring Tools
6 th	Brush, CRO, Nipper

5. Software applications for troubleshooting of Mobile sets.**04Hrs.**

Hour	Topic
1 st	Flashing, Full Flash, Partial Flash, Flash Software for different mobiles, flash cables
2 nd	Mobile Sets Formatting, Storage Card Formatting
3 rd	Unloading, Use of Secrete Codes
4 th	Downloading Mobile Software, downloading utilities

6. Troubleshooting techniques regarding display, transmission, reception, volume control, charger, Battery etc. 08Hrs.

Hour	Topic
1 st	Troubleshooting through circuit diagram, working on SMD/BGA ICs and the PCB
2 nd	Transmission: Antenna, RF Power amplifier
3 rd	Transmitter filter, Audio IC, Microphone
4 th	Reception: Antenna, RF Power amplifier
5 th	local Oscillator, Audio IC, Speaker
6 th	Charger: connecting lead of Battery charger
7 th	Charging I/P of mobile set, Battery charger circuit
8 th	Charging control/ Power IC

List of Equipments / Components for Practical

S. No.	Particulars
1.	Resistance of different value and Wattage ratings
2.	Capacitor of different types
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4.	Rectifier Diode
5.	Zener Diode of different values
6.	Step down Transformers of different ratings
7.	LED of different colours
8.	3 Pin Voltage Regulators
9.	Logic GATE ICs
10.	Tool Kit
11.	Digital Multimeter
12.	CRO
13.	Soldering Iron
14.	Solder Wire
15.	Soldering Flux
16.	Microwatt Soldering Iron
17.	Desoldering Station
18.	Desoldering Pump
19.	Project Board
20.	Hot Air Gun
21.	GSM Mobile Trainer Kit
22.	Mobile Set with detail service Manual
23.	Connector Set for GSM Mobile interface with PCs
24.	Multistand Connecting wire
25.	Single stand connecting wire