<table>
<tr><td>1</td><td>Name of Course</td><td>Certificate Course in Repair and Maintenance of Photo Copier & Fax Machine (301116)</td></tr>
<tr><td>2</td><td>Max. Nos. of Student</td><td>25 Students</td></tr>
<tr><td>3</td><td>Duration</td><td>6 Months</td></tr>
<tr><td>4</td><td>Type</td><td>Part Time</td></tr>
<tr><td>5</td><td>Nos. of Days / Week</td><td>6 Days</td></tr>
<tr><td>6</td><td>Nos. of Hours /Days</td><td>4 Hrs</td></tr>
<tr><td>7</td><td>Space Required</td><td>Theory Class Room – 200 sqft Practical – 200 sqft</td></tr>
<tr><td>8</td><td>Entry Qualification</td><td>S.S.C. appeared</td></tr>
<tr><td>9</td><td>Objective Of Syllabus/ introduction</td><td>1) Knowledge of soldering techniques, use of tools in assembly.
2) Knowledge of electronic competent used in Photo Copier & Fax Machine
3) Ability to read schematic layouts wrings diagrams.
4) Awareness of Safety precautions.
5) Maintenance of various Instruments used Consumer electronics maintenance.</td></tr>
<tr><td>10</td><td>Employment Opportunity</td><td>The trainee will either to be able to take up jobs with agencies which maintain and repair such equipments or with working experience will be in a position to start his own independent Business.</td></tr>
<tr><td>11</td><td>Teacher’s Qualification</td><td>Diploma in Industrial Electronics.</td></tr>
<tr><td>12</td><td>Training System</td><td>Training System Per Week
<table>
<tr><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>6 hrs</td><td>18hrs</td><td>24hrs</td></tr>
</table></td></tr>
<tr><td>13</td><td>Exam. System</td><td>
<table>
<tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Min. Marks</th></tr>
<tr><td>1</td><td>30111611</td><td>Basic Electronics & Assembly Technique</td><td>TH-I</td><td>3 hrs</td><td>100</td><td>35</td></tr>
<tr><td>2</td><td>30111612</td><td>Repair & maintenance of Photo Copier & Fax Machine</td><td>TH–II</td><td>3 hrs</td><td>100</td><td>35</td></tr>
<tr><td>3</td><td>30111621</td><td>Basic Electronics & Assembly Technique</td><td>PR–I</td><td>3 hrs</td><td>100</td><td>50</td></tr>
<tr><td>4</td><td>30111622</td><td>Repair & maintenance of Photo Copier & Fax Machine</td><td>PR-II</td><td>3 hrs</td><td>100</td><td>50</td></tr>
<tr><td></td><td></td><td>TOTAL</td><td></td><td></td><td>400</td><td>170</td></tr>
</table></td></tr>
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SYLLABUS

Theory - I

Basic Electronics & Assembly Technique

1. Introduction of training & institute, Familiarization with the institute, type of work & responsibility of trainees, syllabus, safety precautions, elementary first aid, and symbols related to the theory Han- Tools & equipments identification, Introduction to Tools & Soldering Techniques, SMT Technology, uses and maintenance
2. Introduction to electricity, batteries, voltage, current, resistance & power ohm's law. Alternating current A. C. induced voltage, current. Direct current simple lead cell, lead acid accumulator, battery charger, Battery is an electric.
3. RESISTORS: - Construction of carbon resistor wire wound resistors, wire wound resistors potentiometer, thermostat, series & parallel connection of resistors colour code of resistors, unit for resistance.
4. Capacitors :- what is capacity & capacitance parallel & series connection of capacitor in electric circuit unit of capacitor different, types of capacitor variable & fixed value trimmers, mica ceramic, paper polyester electrolytic etc value of capacitor
5. Inductor & transformer-coil concept, mutual induction series & parallel connection of inductors Types of coils, air core, Iron core, Powdered iron core etc. unit for inductance Transformers, turns ration types of transformer, step-up & step down transformer, power transformer etc.
6. Simple Meters: - Moving coil meter voltmeter, ammeter, ohm meter, multimeter (Moving coil and digital).
7. Semiconductor: - difference between semiconductor & conductor, Germanium & Silicon. Type semiconductor 'P' type & 'N' type semiconductor, P.N. junction diode, junction diode types of diodes, Zener diode, LED etc.
8. Transistor: - PNP and NPN transistor pin configuration, CB, CE, CC connection function of transistor Heat sink, use of heat sink. P C B (printed circuit Board).
9. Rectifiers, filters, Regulated power supply with Zener diode, transistors and regulator IC's 741, 7806, 7906, 7812, 7912, etc.
10. Op-Amp - Introduction, applications, construction, comparators.
11. 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.
12. Amplifier: - Range of audio amplifier frequency use of amplifier, types of amplifier transistor as an amplifier, coupling of amplifier pre-amplifier.
13. AF power amplifier: - Use of transformer matching, push-pull amp. Transformer less amplifier, differential amplifier, feedback circuit.
14. What is IC? Use of IC's in Home Theater, IC based AF power amplifiers with different no's IC's.
15. Transducer

Microphones, Loudspeakers, Photocell, Laser diodes, Telephone.

Theory – II

Repair & maintenance of Photo Copier & Fax Machine

Photo Copier

1. Electrical and personal safety, dangers and preventions.
2. Principle of photo copying.
3. Photo sensitive materials- selenium etc..
4. Image transfer methods.
5. Various types of sensors and their functions.
6. Electrostatic charger and charging of drum assembly.
7. Toner and its properties.
8. Paper trays, Paper feed mechanism and the sensors used for paper movement.
9. Effects of light Intensity on charging the drum unit..
10. Focusing, enlargement methods.
11. Functions of control module - fault codes.
12. Fault finding methods and procedure for copier machines.
13. Principle of Colour Copiers.
14. Multipurpose copy printers and heavy duty copiers.

Fax machine

1. Principle of Fax machine.
2. Properties of telephone line, ISDN line.
3. Data reception and printing Checksum and its importance.
4. Scanning of paper and converting to data.
5. Printers thermal and ink , their working principles.
6. Paper trays, Paper feed mechanism and the sensors used for paper movement.
7. Functions of control module - fault codes.
8. Fault finding methods and procedure for Fax machines.
9. Paper roll loading.
10. Replacement of Toner.

Laboratory Practical

Practical –I

Basic Electronics & Assembly Technique

1. Introduction to work- shop & equipments care. Introduction to electricity supply system. Uses of Tools, measuring instruments soldering & disordering.
2. Identification of conductors, insulator voltage, current power. Test measure of A. C. Voltage current. Test of measure of D. C. Voltage and current.
3. To study differ. Types of resistors. Colour code reading valve of resistors calculation of series & parallel resistance testing of resistance by multimeter.
4. Checking of capacitor, testing by multimeter. Function and uses of capacitor.
5. Checking of coil by multimeter. Checking of differ. Type of transformer hot checking & cold checking To sturdy their uses.
6. Operation, Rules and use of multimeter, voltmeter, ammeter.
7. Testing of P N junction diode by multimeter Identify their poles (A & K.)
8. Transistor testing by multimeter Identification of lead, Build a CB, CC & CE circuits. Design the PCB.
9. Assembled various rectifier circuits with R.C. & L. C. filter CKT. Voltage doublers circuit.
10. Build Zener diode regulator circuit, Build transistor regulator circuits, Build a regulator circuit, and Build a regulator IC power supply
11. Find the total load and select a suitable UPS/Inverter (rating factor) Installation of UPS and Inverters Maintenance of battery.

Laboratory Practical

Practical –Ii

Repair And Maintenance Of Photo Copier & Fax Machine

Photo Copier

1. Practice procedures for safety and health hazards measures
2. Operation of a photo copier..
3. Dismantling and assembling of paper feed mechanism, paper tray, Thermal unit and Toner Unit.
4. Identify the various sensors used in the copier and their fixtures.
5. Fault finding and repairing in electrostatic high voltage unit.
6. Dismantling and fitting of drum unit- cleaning of drum unit.
7. Dismantling and refitting of Carriage unit , mirror unit and light unit.
8. Fault finding in light unit.
9. Identify the faults and repair in the thermal unit.
10. Control modules- understand the fault codes and identify the faulty sections.
11. Fault finding in control module.
12. Periodic cleaning and servicing of copier machines.
13. Overall fault finding and repair a photo copier machine.
14. Fault finding and repair of Colour copiers.
15. Repairing of Jumbo copiers.
16. Repairing of multipurpose copy printers.
17. Repairing of heavy duty copiers.

Fax Machine

1. Operation of a Fax machine..
2. Telephone line access and phone connection.
3. Dismantling and assembling of paper feed mechanism, paper tray, Thermal unit and Toner Unit of Fax machine.
4. Identify the various sensors used in the Fax machines.
5. Thermal printers and Ink printers.
6. Identify the faults and repair in the thermal printer unit..
7. Control modules- understand the fault codes and identify the faulty sections.
8. Fault finding in control module.
9. Periodic cleaning and servicing of fax machines.

List of Tools Equipment:

	Description of Items	Qty.
1	Crimping tool set	4
2	Spanner set DE, Ring	2
3	Screw drivers assorted size	2 each
4	Soldering Iron 65w	2
5	Neon Testers, 500V	2
6	Combination Plier	4
7	Loose Nose plier	4
8	Diagonal cutter	4
9	Neon Tester	16
10	Screw driver set	16
11	Electrician Knife	16
12	Allen key set	4
13	Electric drilling machine portable 10mm	4
14	Bench vice 200mm	6

Equipment List

Sr. No	Description of Item	Qty.
1	Dual Power supply 0-30v, 5 amp	2
2	AC Power supply	2
3	CRO 50 Mhz	2
4	Digital Multimeter	4
5	DeSoldering Pump	4
6	Watt meter 10A	1
7	Earth Megger	2
8	Function Generator	2
9	Discharge Tester	2
10	Photo copier (mono)	1 each
11	Photo copier colour	1 each
12	Copy printer	2 set
13	Jumbo copier	1
14	Fax machine	1
15	High voltage test unit	1

Reference Book

1. Principles of Electronics By V. K. Mehta.
2. Power Electronics By S K Sohni
3. Switch mode power supply handbook, By Billings, Keith H.

B) Video CD/DVD

1) Fundamental of Electricity I and II
2) Safety in Electrical
3) Multimeter
4) Know your oscilloscope
5) Waves
6) Transformer
7) Junction Diode
8) Semi Conductor I, II, III.
