Certificate Course in Electronics Hardware Maintenance
(Add on Course for B.A\B.Sc\B.Com)

Examination Scheme for Year 2011-12

1st Year Electronics Hardware Maintenance (Certificate Course)

S.No.	Course	Schedule for Teaching				Schedule of Examination		
1.	Certificate Course in Electronics Hardware Maintenance	L	T	P	Total	Theory Marks	Practical Marks	Total Marks
		4	-	8	12	150	50	200

Subject: Certificate Course in Electronics Hardware Maintenance-Theory

NOTE: There will be eight questions in total and only five questions are to be attempted. There will be four periods of theory classes and eight periods of practical classes weekly.

1. **Basic Electronics**

   Concept of electronics, application of electronics in various fields, modern trends, Advantages, analog and digital electronic, manufacturing methods using PCB and SMD technologies.

   4 Periods

2. **Hardware Maintenance Concepts**

   Identification, Specification and uses of hand tools, Soldering techniques, electrical and electronic symbols, safety features of electrical appliances and equipments, Danger of shock and fire.

   4 Periods

3. **Elementary Concepts**

   Conductor, Insulator and semiconductor classification, Voltage, current, resistance, power, energy. Voltage source, Dry cells, battery, Fuses-types & ratings, MCB.

   8 Periods

4. **Alternating Current**

   Explanation of A.C, Comparison with D.C. Instantaneous values, R.M.S. values, phase cycle, Time period, frequency. Domestic power supply, single phase and three phase.

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7. Capacitance

Explanation of capacitance, Classification of capacitors with specification, dielectric constants, material used, Series and parallel connection, Colour codes, stored energy, RC circuits, Time constant.

4 Periods

8. Measuring Instruments

Classification of meters, Need of calibration, Resolution, accuracy, Use of Multimeter, CRO, insulation tester. Type of bridge circuits and their use in measurement.

8 Periods

9. Introduction to Semiconductors

Types of Semiconductor, intrinsic and extrinsic semiconductors. Temperature coefficients. Definition of P and N types of Semiconductor. How to make N type and P type, Silicon and Germanium material, majority and minority carriers. Biasing of P type and N type semiconductors.

4 Periods

10. Semiconductor Diode

Explanation of Diode, Classification, characteristics, application of diodes. Zener diode functioning and applications, Diode as rectifier. Half wave, full wave bridge rectifier, testing of diodes.

4 Periods

11. Bipolar Junction Transistors

Bi- Polar junction transistor, Principle of operation, types of transistor, Symbol, application circuits as an amplifier and a switch, thermal run-away.

4 Periods

12. Sensors and Transducers

Basic working principle, use & specifications of : LED‘s, photo diodes, photo transistors, thermistors, LDR, microphone & loud speakers.

4 Periods

13. Digital Electronics

Explanation of Digital System, comparison with analogue, advantages, applications, Number systems- Binary, Hexadecimal, Octal conversions, BCD, Basic logic gates, NAND, NOR, Ex-OR, Ex-NOR, Buffer, Encoder, Decoder, Seven segments Decoder, Multiplexer, De-multiplexer, FLIP-FLOP’s. Digital IC’s

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Subject: Certificate Course in Electronics hardware Maintenance-Practicle

1. Demonstration of assembled printed circuit board and components.
2. Demonstration and uses of hand tools, screw driver, pliers, threading tools, drilling machine, soldering and de-soldering practice.
3. Identification of conductors and insulators.
4. Practice of simple series and parallel circuits to measure current, voltage, energy, Battery/cell series and parallel connections.
5. Testing of MCB.
6. Demonstration of A.C. & D.C., instantaneous and RMS values, phase, time period, frequency and measurement of A.C. voltages.
7. Use of Multimeter for the measurement of voltage, current and resistance.
8. Identification of resistors using color code. Classification of resistors, Carbon, metal film and wire wound resistors (various Wattages), presets, Potentiometers, Study of resistor network.
9. Identification of inductors. Transformer testing of various specifications
10. Identification and testing of different types capacitors. Colour code practice. Behaviors of capacitor at different frequencies. Measurement of capacitance.
11. Demonstration of LCR bridge for the measurement of resistance, voltage, current, capacitance, frequency and inductance.
12. Testing and behaviour of diode, zener diode, construction of half wave, full wave and bridge rectifier.
13. Lead identification and testing of a transistor. To study the function of a transistor as a switch and amplifier.
14. Demonstration and testing of LED circuits, microphones and servicing of loud speakers.
15. Study of Digital IC's, Verification of the truth tables of Logic gates. Use of NAND, NOR gates to build basic gates.
16. Verification of the truth tables Encoder, Decoder , Multiplexer, Demultiplexer, Flip-Flops.
17. Demonstration of various types of power supplies. Assembly and testing of an unregulated power supply, testing of a voltage stabilizer as per specifications to be used for domestic applications. Demonstration of UPS and SMPS.
18. Testing and repair of dc adaptors, Voltage stabilizers, florescent tube light, fan regulator, door bell, fancy lights, etc. Repairing of electric Iron, Oven, room-heater, blower, immersion rod, Geysor, Toaster.

Diploma Course in Electronics Hardware maintenance(2nd year)
(Add on Course for B.A\B.Sc\B.Com)

Examination Scheme for Year 2011-12

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Subject: Diploma Course in Electronics Hardware Maintenance-Theory

NOTE: There will be eight questions in total and only five questions are to be attempted. There will be four periods of theory classes and eight periods of practical classes weekly.

1. **Personal Computers & Peripherals**

   The central processing unit, CPU speeds, word size, data path, cache memory, memory types, system clock, power supply, keyboard, mouse, video adaptors, SCSI, Floppy disk controller and Disc drives, CDROM Drives, Hard disk interfaces, Modems and Communication Ports, LAN Adapters, sound cards.

   (14 periods)

2. **Preventive Maintenance of PC**

   Heat and thermal shock, safe temperature range for PCs, Removing heat, Good and bad box designs, Dealing with dust, Magnetism, stray electromagnetic interference, power noise, avoiding exposure to water and liquids, making environment PC-friendly.

   (8 periods)

3. **Power supplies and Power Protections**

   Components of SMPS, power supply connections, upgrading power supply, Troubleshooting the power supply, replacing the power supply, checking outlet wiring, solutions to power problems.

   (8 periods)

4. **Installing and maintaining storage Devices**

   Steps in hard drive installation, System's CMOS configuration, Hard disk software installation, partitioning , DOS formatting, Backing up hard disk drives, computer virus, detection & clearing virus, suggestions for keeping virus away, keeping uptodate with new virus. Floppy drives, removing, configuring and installing floppy drives, pen drive.

   (12 periods)

5. **Installing and Troubleshooting printers**

   Parallel, serial & USB ports, Laser, inkjet, dot matrix , daisy wheel, thermal printers, cables, port problems, software problems, printer driver.

   (10 periods)

6. **Peripherals installation & Troubleshooting printers**

   Keyboard components, connectors, cable continuity, disassembling keyboard,

card characteristics, video troubleshooting, sound cards, CD-ROM installation, Physical installation, CD-ROM software installation.

(16 periods)

7. Internet and Software Installation

World wide web, using and installing software for internet, configuring internet for dial-up and LAN access, installing operating systems and application software, like windows, LINUX, Office, Antivirus, TELLY etc.

(16 periods)

Recommended Books

1. The complete PC upgrade and maintenance guide, Mark Minasi, BPB Publications, 2001.
2. Upgrading and repairing PCs, Scott Mueller, Prentice Hall of India.

Advanced Diploma Course in Electronics Hardware Maintenance(3rd Year)
(Add on Course for B.A\B.Sc\B.Com)

Examination Scheme for year 2011-12

3rd Year Electronics Hardware Maintenance(Advanced Diploma Course)

Subject: Advanced Diploma Course in Electronics Hardware Maintenance-Theory

Note: There will be eight questions in total and any five questions are to be attempted. There will be four periods of theory classes and eight periods of practical classes weekly.

7. Mobile Connectivity

Introduction to mobile telephone, setup procedure, preventive maintenance of mobile sets, mobile phone servicing and related technical information, mobile interfacing connector using Bluetooth interface, USB message interface, camera interface.

14 periods

Recommended Books:

1. Local Area Networks by Robert M. Thomas, BPB publications.
2. UPS,12V by Er, M.L. Chandna, Gurukul Technicals Institutes (English Medium)
3. MOSFET Inverter by K.C. Agarwal, Micropublications, Aligarh (English Medium)

Subject: Advanced Diploma Course in Electronics Hardware Maintenance (Practical)

1. Learning various LAN network topologies.
2. Installing switches, hubs in LAN networking and understanding types of cables used in networks.
3. Use of firewall in connecting network.
4. Development of automatic battery charger circuit.
5. Fabrication of MOSFET based 50Hz UPS circuit.
6. Development of Inverter overload protector circuit with delayed auto reset.
7. Troubleshooting of Power supply section of STD/ISD PCO.
8. Fabrication of telephone amplifier circuit used in landline equipment.
9. Development of low cost PCO billing meter.
10. Installation and handling of public address system and correcting audio problems in the system.
11. Fabrication of 2- line intercom-cum-telephone line change over circuit.
12. Interfacing digital camera with personal computer.