Computer Repair and Maintenance

EG3104CT

Year: III **Total: 5 hours /week**

Part: I **Lecture: 2 hours/week**

Tutorial: hour/week

Practical: hours/week

Lab: 3 hours/week

Course Description:

This course deals about fundamental concept, theories and popular principles of repair and Maintenance systems of computer. The major focus is trouble shooting, repairing and maintenance into real-life by utilizing the knowledge and skill of computer hardware and software. This makes the learning-teaching process more interactive, skillful and interesting.

Course Objectives:

At the end of the course student will be able to

1. Explain basic operation of computer
2. Perform the maintenance of computer, its accessories and peripherals
3. Take Care of computer and its accessories

Course Contents:

Theory

Unit 1. Introduction **[2 Hrs.]**

1.1. Definition of Computer, Hardware and software
1.2. Computer Repair and Maintenance
1.3. Importance of Computer Repair and Maintenance
1.4. Hardware maintenance
1.5. Software Based maintenance

Unit 2. System Case **[2 Hrs.]**

2.1. Style and size
2.2. Form Factors
2.3. Switches
2.4. LEDs
2.5. Drive bay

Unit 3. Power Supply **[2 Hrs.]**

3.1. Ratings
3.2. Working Principle
3.3. Block Diagram
3.4. SMPS Concept

Unit 4. Mother Board and System Devices **[2 Hrs.]**

4.1. Form factor
4.2. Parts
4.3. Chipset and controller
4.4. Buses
4.5. BIOS

Unit 5. Processor **[3 Hrs.]**

5.1. Arithmetic Logic Unit (ALU)
5.2. Control Unit, Register
5.3. Buses (Data bus, Address Bus, Control Bus)

Unit 6. UPS **[2 Hrs.]**

6.1. Introduction to UPS
6.2. Importance of UPS
6.3. UPS system Maintenance

Unit 7. Input Devices **[2 Hrs.]**

7.1. Scanner
  7.1.1. Basic operation of Scanner
  7.1.2. Types of Scanners
  7.1.3. Resolution
  7.1.4. Port/slot
7.2. Repair of Scanner

Unit 8. Storage devices **[4 Hrs.]**

8.1. Hard disk (Construction and Operation, Speed, Disk Geometry, Track, Cylinder and sectors, Capacity, Partitioning and Formatting)
8.2. Compact Disk (CD/DVD, Color book Specification, Performance and Reliability, CD/R-W principle)
8.1. External HDDs Vs SSDs

Unit 9. Output devices **[3 Hrs.]**

9.1. Monitor
  9.1.1. CRT (Simple working Principle)
  9.1.2. LED
9.2. Printer
  9.2.1. Basic Operation & Installation of Printer
  9.2.2. Types of Printers
  9.2.3. Resolution
  9.2.4. Port/slot
9.3. Repair of printer

Unit 10. System Care **[8 Hrs.]**

10.1. Preventive Maintenance
  10.1.1.General system care factors
  10.1.2.Cooling and Ventilation
  10.1.3.Power protection
  10.1.4.Data loss and virus protection
10.2. Data problem detection
  10.2.1. Virus detection and protection
  10.2.2. Background of viruses
  10.2.3. Virus scanning and antivirus software
10.3. Backup and Disaster Recovery:
  10.3.1.Risk of data,
  10.3.2.Backup methods devices and media,
  10.3.3.Backup scheduling,

10.3.4. Recovery of data

Practical: **[45 Hrs.]**

1. **Identification and Selection of Required Tools**
   - 1.1. **Physical Assembly procedure:**
     - 1.1.1. Safety procedure
     - 1.1.2. System case selection and preparation
     - 1.1.3. layout of mother board
     - 1.1.4. Secondary storage devices fitting and connections
     - 1.1.5. Memory insertion
     - 1.1.6. Power Connection
     - 1.1.7. Processor and heat sink fitting
     - 1.1.8. Connection of indicators and switches
     - 1.1.9. Setting of jumpers
     - 1.1.10. Insertion of peripheral cards like audio, NIC, Modem, Video Cards etc if necessary
   - 1.2. **Installation of Operating Systems:**
     - 1.2.1. Management of Hard Disk (Partition and formatting)
     - 1.2.2. BIOS setup and installation of Operating system (Windows, Linux etc.)
     - 1.2.3. Installation of Device drivers, Configuration, Installation of Application Programs and antivirus
   - 1.3. **Connecting Multiple Computers Together:**
     - 1.3.1. Construction of UTP cable (Straight through and Cross-cable, connecting through HUB, Switch or Direct connection, Assigning IP numbers and testing of networking
   - 1.4. **Troubleshooting and Repairing Techniques:**

     System Case, LEDs or Case Buttons, Key Lock, Power Sources and Power Protection Devices Cooling fans, air circulation, Motherboard and System Devices, General Failures, CMOS Memory or Real-Time Clock, System BIOS, Resources and Expansion Cards, Processor, System Memory, Memory Not Recognized, Out of Memory Problems, Performance Issues, Video Cards, Failure or Improper Operation, Image Quality Problems, Performance or Video Mode Issues, Monitors, Failure or Improper Operation, Hard Disk Drives, Booting or Operation Problems, Configuration Issues, Disk Compression Issues, Drive Letter Issues, File System Problems, Operating System, CD/DVD- ROM Drives, Drive Not Recognized, Configuration Problems, Audio Issues, Peripheral I/O Ports, Keyboards, Mice, Modems, Network Card, Operation and Connection Problems, Speed Issues, Applications Program Failure.

2. **Installation and maintenance of peripheral equipment**
   - 2.1. **Printer**
     - 2.1.1. Installation of printer driver
     - 2.1.2. Replacement of tonner/cartridge
     - 2.1.3. Troubleshoot and maintenance of Printer
   - 2.2. **Scanner**
     - 2.2.1. Identification of Scanner component
     - 2.2.2. Connection of scanner
     - 2.2.3. Installation of scanner device

Final written exam evaluation scheme			
Unit	**Title**	**Hours**	**Marks Distribution***
1	Introduction	2	3
2	System Case	2	3
3	Power Supply	2	3
4	Mother Board and System Devices:	2	3
5	Processor	3	4
6	UPS	2	3
7	Input devices	2	3
8	Storage Devices	4	5
9	Output Devices	3	4
10	System Care	8	9
	Total	**30**	**40**

* There may be minor deviation in marks distribution.

Reference:

1. Winn, L. Rosch (1994). *The hardware Bible* (3rd Edition). Brady Publishing
2. Peter, Norton (2000). *Introduction to Computers* (4th Edition). New York city: McGraw-Hill Higher Education
3. Mark, Minasi (1998). *The Complete PC Upgrade and Maintenance Guide.* United States: Sybex Inc
4. Mueller, Scott (2015). *Upgrading and Repairing PCs (22nd ed).* Que Publishing