

Course Name : Computer Engineering Group
Course Code : CM/CO/IF/CD
Semester : Fourth
Subject Title : Computer Architecture and Maintenance
Subject Code : 12113

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	25#	25@	150

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

Rationale:

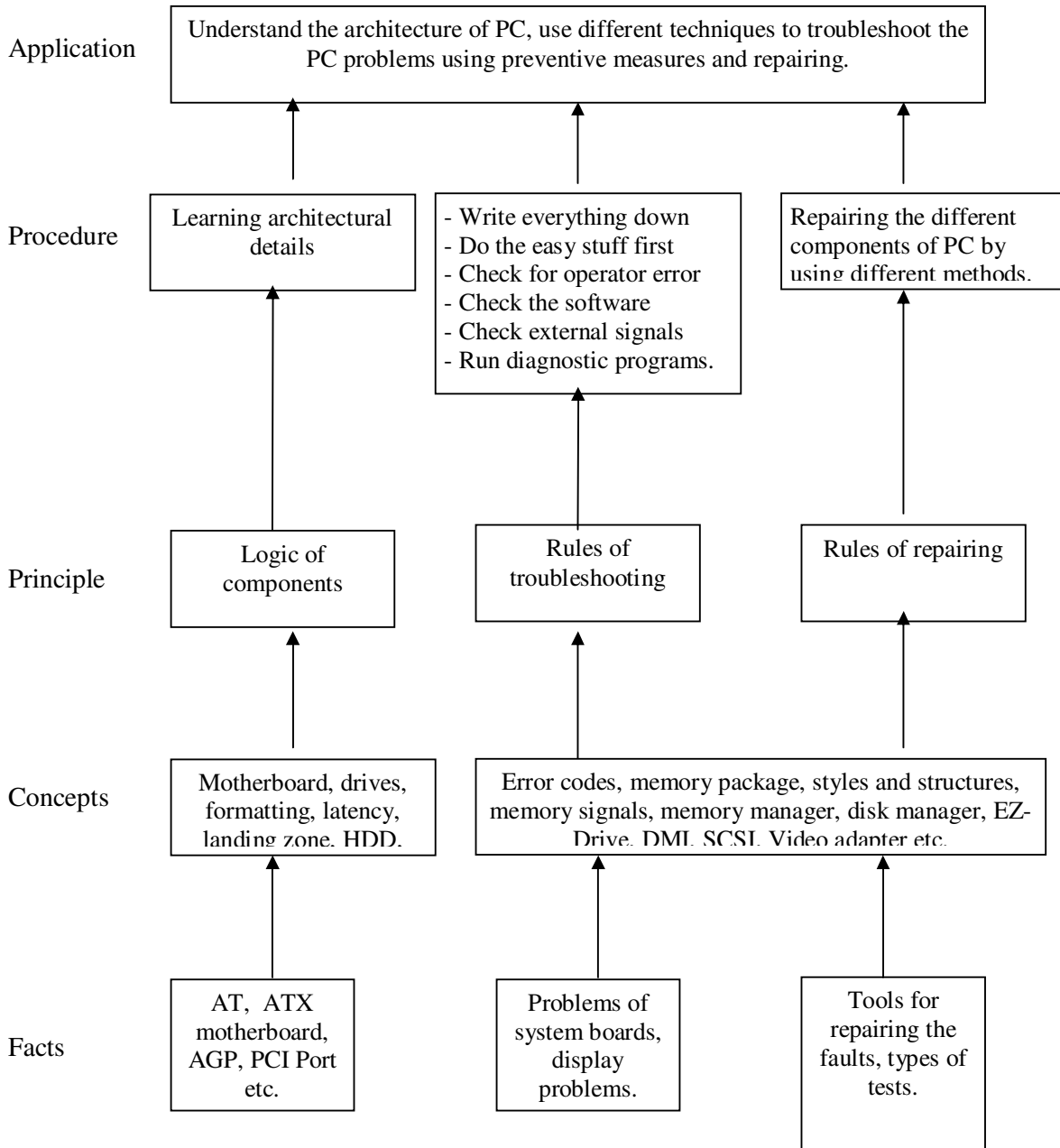
The aim of the subject is to teach the basic working of the computer motherboard, peripherals and add-on cards. The subject helps the students to do the maintenance of the Computer, peripherals and its add-on cards. The students will be able to select the proper peripheral as per their specification and requirement. This is the core subject. The pre-requisite of the subject is Microprocessor. The subject is practical oriented and will develop the debugging skills in the students.

Objectives:

The student will be able to:

1. Debug and repair the faults in system.
2. Assemble the system.
3. Load the operating system and device drivers in the system.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
1	Motherboard And Its Components: 1.1 Chipset basic, chipset Architecture: North / South Bridge architecture and Hub architecture. 1.2 Architecture of Intel chipset 915 G & 945 G 1.3 Overview and features of ISA, PCI-X, PCI-X press, AGP, PCMCIA, AGP, Processor BUS (no pin description) PCI versus PCI Express 1.4 Logical memory organization: Conventional memory, Extended memory, Extended memory, upper memory (No memory map) 1.5 Concept of cache memory : Internal cache, External cache (L1, L2, L3 cache) 1.6 Overview and features of SDRAM, DDR, DDR2, DDR3 1.7 Features of Intel processors : Pentium, P2, Celeron, P3, P4, Pentium D and AMD processors : K6, Athlon XP, Athlon 64 1.8 Processor Modes : Real mode, Protected mode, Virtual real mode, 64 bit extension mode (AMD 64, EM 64) 1.9 Bios Basics, main functions 1.10 Motherboard Selection criteria	10	16
2	Storage Devices And Its Interfacing: 2.1 Recording Technique : FM, MFM, RLL Perpendicular magnetic recording 2.2 Hard disk construction and working 2.3 Servo Techniques : Wedge servo, Embedded servo, dedicated servo 2.4 Terms related to Hard Disk : Track, Sector cylinder, cluster, landing zone, MBR, Zone recording, write precompensation 2.5 Formatting, Low level formatting, High level formatting, partitioning 2.6 FAT basics, Introduction to file system FAT 16, FAT 32, NTFS 2.7 Hard disk drive interface : features of parallel AT attachment (PATA), Serial ATA (SATA), ATA devices jumper selections: Master, slave, cable select, ATA cables 2.8 ATA RAID : RAID 0, RAID 2.9 CDROM drive : Construction, Recording 2.10 DVD : Construction, Recording 2.11 Blu-ray disk specification	08	20
3	Display Devices & Interfacing: 3.1 CRT colour monitor : Block diagram and function of each block 3.2 Characteristics of CRT monitor : Dot pitch, Resolution, Video bandwidth, Horizontal scanning frequency, vertical scanning frequency, Interlaced versus non interlaced monitor 3.3 Advantages of CRT display related to LCD display 3.4 LCD monitor : functional block diagram of LCD monitor, working principal, advantages and disadvantages Types : Passive matrix and Active matrix, Important characteristics : Resolution, Refresh rate, Response time 3.5 Basic block diagram of a video accelerator care.	05	12
4	Input & Output Devices:	08	16

	Construction and Working 4.1 Keyboard : Types of keyswitches : Membrane, Mechanical, Rubber dome, Capacitive and interface 4.2 Mouse : Mechanical, Optomechanical, optical (New design) 4.3 Scanner : Flat bed, sheetfed, Handheld : Block diagram and specifications, OCR, TWAIN, Resolution, Interpolation 4.4 Modem : Internal and External : Block diagram and specifications 4.5 Printer : Dot matrix, Inkjet, Laser : Block diagram and specifications.		
5	Power Supplies 5.1 Block diagram and working of SMPS. 5.2 Signal description and pinout diagram of AT and ATX connectors 5.3 Power supply characteristics : Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation 5.4 Power problems : Blackout, Brownout, surges and spikes 5.5 Symptoms of power problems 5.6 Protection devices : circuit breaker, Surge suppressor : working UPS : Block diagram, working, Types, Ratings.	04	12
6	Interfaces: 6.1 SCSI, SCSI cables and connectors, SCSI drive configuration. 6.2 USB features 6.3 RS 232 : (voltages and 9 pin description) 6.4 Centronics (interface diagram, important signals and timing waveform) 6.5 Firewire features	05	12
7	PC Troubleshooting, Maintenance and Tools 7.1 Preventive Maintenance : Active, Passive, periodic maintenance procedure 7.2 Preventive maintenance of peripherals of PCs. 7.3 Fault finding and troubleshooting of the above peripherals 7.4 ESD (Electrostatic discharge), RFI protection, Earthing 7.5 Diagnostic software 7.6 Working of logic probe, logic pulser, current tracer 7.7 Block diagram and working of logic analyzer & CRO 7.8 Virus infection symptoms, precautions to prevent a virus infection	08	12
TOTAL		48	100

PRACTICAL:

Skills to be developed:

Intellectual skills:

- Understanding basic hardware of computer
- Fault finding of input/output devices
- Troubleshooting of input/output devices
- Proper connection of input / output devices

Motor skills:

- Proper handling of Computer System hardware.

List of Practical:

1. Drawing the motherboard layout of Pentium IV and studying the chipset through data books or Internet.
2. CMOS setup of Pentium.
3. Hard Disk Partitioning.
4. Study of HDD: Identify various components of HDD and write their functions.
5. Study and installation of any one display cards: VGA or SVGA display cards.
6. Installation of Scanner, Printers and Modems.
7. Study of SMPS (ATX)
8. Study of Diagnostic Softwares. (Any one)
9. Fault findings:
 - (a) Problems related to monitor.
 - (b) Problems related to CPU.
10. Assembling of PC and Installation of Operating System.
11. Configuration of Client and Server PC, Laptop and Network components.
12. RS232C communication between two computers.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
01	Mike Meyers, Scott Jernigan	Managing & Troubleshooting PCs	Tata McGraw Hill
02	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
03	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	BPB Publication
04	D. Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill
05	Scott Muller	Upgrading & Repairing PCs	Techmedia