

Course Name : Computer Engineering Group
Course Code : CO/CD/CM/CW/IF
Semester : Fourth
Subject Title : Computer Hardware & Maintenance
Subject Code : 17428

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).

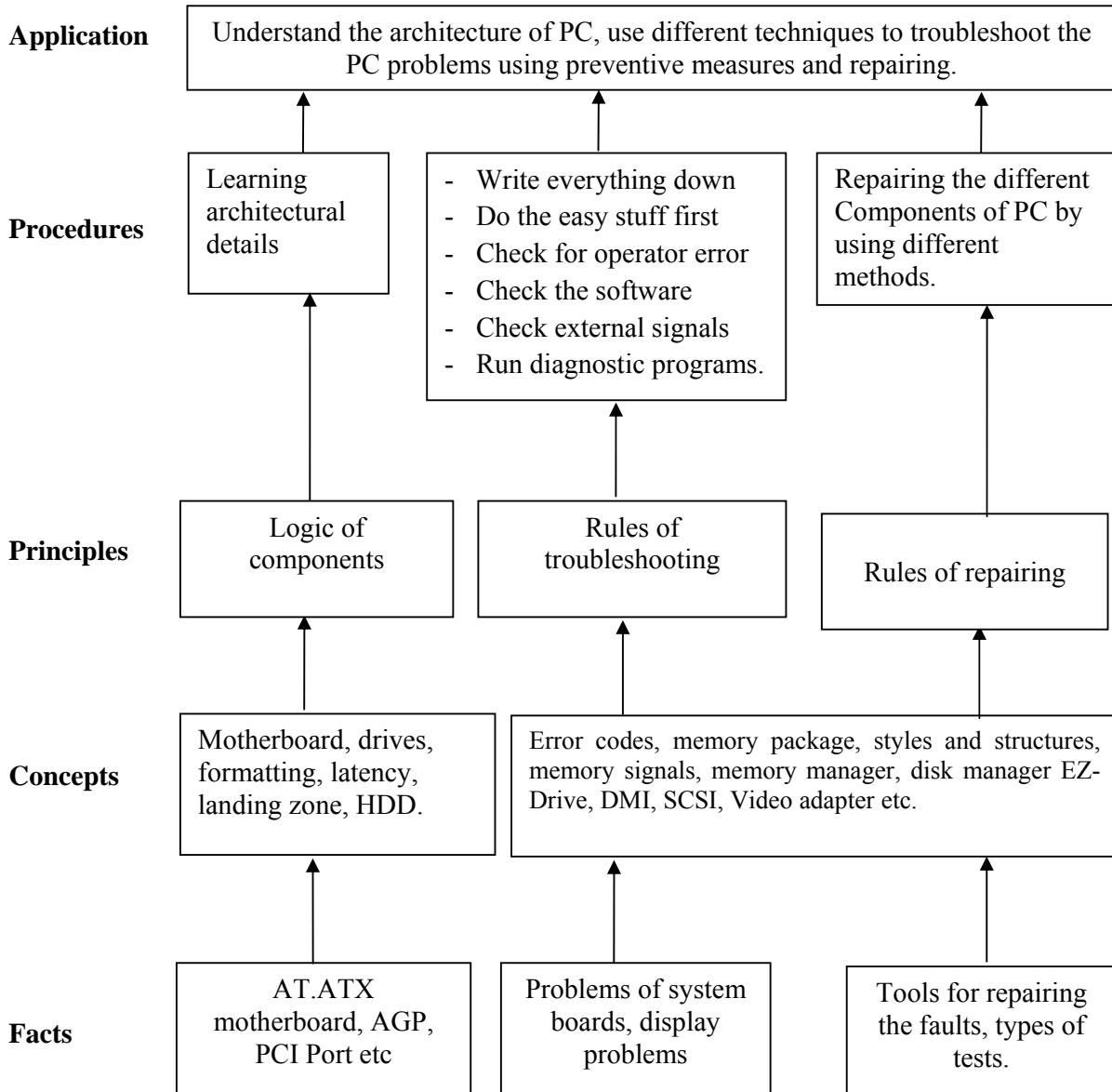
Rationale:

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 technology 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:

Theory:

Sr. No	Theory	Hrs.	Marks
1	Motherboard & Its Component <u>Specific Objectives</u> <ul style="list-style-type: none"> ➤ To Understand the various components of Motherboard. ➤ To Know about the different memories in PC & their usage. ➤ To Understand the selection of different components of PC. 1.1 CPU – Concept like address lines, data lines, internal registers. 1.2 Modes of operation of CPU – Real mode, IA-32 mode, IA-32 Virtual Real Mode. 1.3 Process Technologies, Dual Independent Bus Architecture, Hyper Threading Technologies & its requirement. 1.4 Processor socket & slots. 1.5 Chipset basic, chipset Architecture, North / South bridge & Hub Architecture. 1.6 Latest chipset for PC 1.7 Overview & features of PCI, PCI –X, PCI express, AGP bus. 1.8 Logical memory organization conventional memory, extended memory, expanded memory. 1.9 Overview & features of SDRAM, DDR, DDR2, DDR3. 1.10 Concept of Cache memory: 1.11 L1 Cache, L2 Cache, L3 Cache, Cache Hit & Cache Miss. 1.13 BIOS – Basics & CMOS Set Up. 1.14 Motherboard Selection Criteria.	12	20
2	Storage Devices & Interfacing. <u>Objective</u> <ul style="list-style-type: none"> ➤ To understand the Recording techniques in storage devices. ➤ To understand the working of storage devices. 2.1 Recording Techniques: FM, MFM, RLL, perpendicular recording 2.2 Hard Disk construction and working. 2.3 Terms related to Hard Disk. Track, sector, cylinder, cluster, landing zone, MBR, zone recording, write pre-compensation. 2.4 Formatting: Low level, High level & partitioning. 2.5 FAT Basics: Introduction to file system, FAT 16, FAT 32, NTFS, 2.6 Hard Disk Interface: Features of IDE, SCSI, PATA, SATA, Cables & Jumpers. 2.7 CD ROM Drive: Construction, recording. (Block diagram) 2.8 DVD: Construction, Recording. (Block Diagram) 2.9 Blue-ray Disc specification.	08	20

3	Display Devices & Interfacing Objective <ul style="list-style-type: none"> ➤ To understand the construction and working of display devices like CRT, LCD. ➤ To understand the Interfacing of above devices to PC. 3.1 CRT: - Block diagram & working of monochrome & colour Monitor 3.2 Characteristics of CRT Monitor :- DOT Pitch, Resolution, Horizontal Scanning frequency, Vertical scanning frequency, Interlaced Scanning, Non-Interfaced scanning, Aspect ratio. 3.3 LCD Monitor: - Functional Block Diagram of LCD monitor, working principle, Passive matrix, Active matrix LCD display. 3.4 Touch Screen Display – The construction and working principle 3.4 Plasma Display Technology: - Construction & working principle. 3.5 Basic Block Diagram of Video Accelerator card	06	12
4	Input and Output Devices Objective <ul style="list-style-type: none"> ➤ To understand the construction and working of Input /Output Devices. ➤ To understand the Interfacing of the above peripherals. 4.1 Keyboard: Types of key switches: Membrane, Mechanical, Rubber dome, Capacitive, optoelectronic and interfacing. 4.2 Mouse: Opto-mechanical, optical (New design) 4.3 Scanner: Flat Bed, Sheet-fed, Handheld: Block diagram of flat Bed and specifications, OCR, TWAIN, Resolution, Interpolation. 4.4 Modem: Internal and External: Block diagram and specifications. 4.5 Printer: Printer Characteristics, Dot matrix, Inkjet, Laser: block diagram and specifications.	06	16
5	Power Supplies Objective <ul style="list-style-type: none"> ➤ To understand the working of SMPS. ➤ To understand the power problems. 5.1 Block diagram and working of SMPS. 5.2 Signal description and pin-out 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. 5.7 Uninterrupted Power Supply, Online and OFFline UPS, working of UPS: Block diagram, advantages and disadvantages, Ratings	04	12
6	Interfaces Objective <ul style="list-style-type: none"> ➤ To understand the ports of PC. ➤ To understand interfacing techniques of devices to ports 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 6.6 Blue tooth	06	12

7	PC Troubleshooting, Maintenance and Tools.	06	08
	Objective		
	➤ To understand the preventive maintenance of PC		
	➤ To understand the diagnostic tools of PC		
	7.1 POST: POST sequence, Beep codes, visual display codes.		
7	7.2 Preventive maintenance: Active, Passive, periodic maintenance procedure.	06	08
	7.3 Diagnostic Tools: logic Analyzer, logic probe.		
	7.4 Diagnostic software for trouble shooting PC.		
	BGA workstation and its applications for reballing of north bridge and south bridge		
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:

01. Identify and draw the motherboard layout of Intel i3 processor and understand connection and layout of the H67 or P67 chipset.
02. Perform Basic Input/output System (BIOS) setting and configuration setup using Complementary Metal Oxide Semiconductor (CMOS).
03. Format, partition and install a Hard Disk Drive (HDD) and format a pen drive.
04. Understand layout, characteristics and functions of different components of Hard Disk Drive (HDD) as a storage device.
05. Install Video Graphics Array (VGA) or Super Video Graphics Array (SVGA) display cards.
06. Install and understand the working of printer.
07. Install and understand the working of Input/output devices such as scanner and modem.
08. Connect Switched Mode Power Supply (SMPS) and identify different parts of SMPS. Understand the working of SMPS and Uninterrupted Power Supply (UPS).
09. Use diagnostic software to identify installed computer peripherals and test their working condition.
10. Find faults related to Monitor, CPU, Hard disk, Printer and other peripherals.
11. Form a pico net using Bluetooth devices and transfer data.
12. Assemble PC and install an operating system.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
01	Scott Muller	Upgrading & Repairing PCs	Pearson
02	Mark Minasi	The Complete PC Upgrade & Maintenance guide	Wiley India
03	Barry Press and Maricia Press	PC Upgrade and Repair	Wiley India
04	Begelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
05	Mike Meyers Scott Jernigan	Managing & Troubleshooting PCs	Tata McGraw Hill
06	D.Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill