Course Name   : **Electronics Engineering Group**

Course Code   : **ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI**

Semester   : **Fifth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Sixth for IU/ED/EI**

Subject Title   : **Computer Hardware and Networking**

Subject Code   : **17533**

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	--	02	02	50	--	--	25@	75

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:

Today is the age of information technology. Hence everyone is required to work on computers and internet. This subject is introduced to focus on basic working of the computer motherboard, peripherals and networking components.

Theoretical and Practical approach while studying this subject will help in understanding for troubleshooting, diagnosing computer and its peripheral related problems. Students will aware of basic concept of networking, its applications, topologies, communication media, network directing devices, protocol used, OSI reference model and TCP/IP model.

This subject will give exposure to students on computer hardware, peripherals, specifications, installation, faults and troubleshooting. Students will also be able to plan, analyze, design, install, configure, test, implement and maintain networking systems

Study of this subject will enable students to select appropriate hardware, list specifications, will identify simple to complex problems and their solutions. The subject is practical oriented and will develop the debugging skills in the students

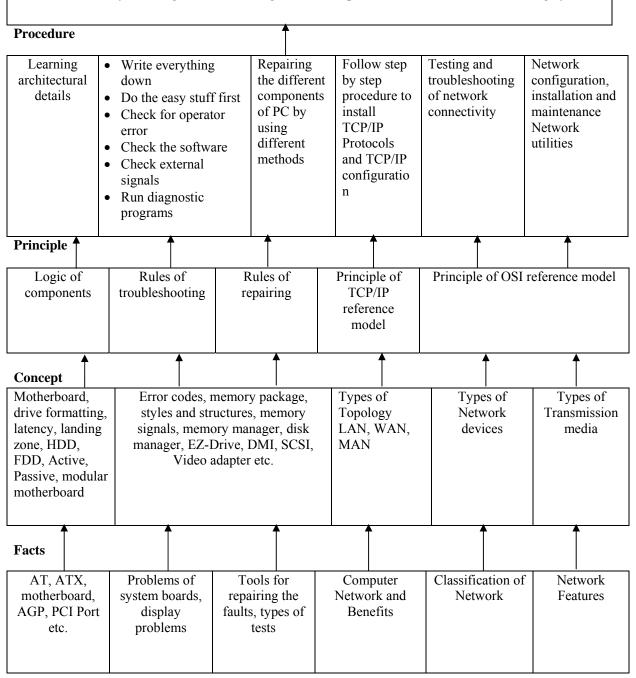**General Objectives.**

Students will able to.
- Understand principle, construction, working of computer peripherals
- Select cost effective, good quality reliable peripherals and equipment
- Identify the problem as hardware or software related.
- Identify and repair the simple faults in computer systems.
- Plan, analyze, design, install, configure, test, implement and maintain networking systems

Learning Structure

Applications

• Selection of appropriate hardware based on application • Repair and maintenance of PC's • Plan, analyze, design, install, configure, test, implement and maintain networking systems

Procedure

Learning architectural details	• Write everything down • Do the easy stuff first • Check for operator error • Check the software • Check external signals • Run diagnostic programs	Repairing the different components of PC by using different methods	Follow step by step procedure to install TCP/IP Protocols and TCP/IP configuration	Testing and troubleshooting of network connectivity	Network configuration, installation and maintenance Network utilities

Principle

Logic of components	Rules of troubleshooting	Rules of repairing	Principle of TCP/IP reference model	Principle of OSI reference model	

Concept

Motherboard, drive formatting, latency, landing zone, HDD, FDD, Active, Passive, modular motherboard	Error codes, memory package, styles and structures, memory signals, memory manager, disk manager, EZ-Drive, DMI, SCSI, Video adapter etc.	Types of Topology LAN, WAN, MAN	Types of Network devices	Types of Transmission media

Facts

AT, ATX, motherboard, AGP, PCI Port etc.	Problems of system boards, display problems	Tools for repairing the faults, types of tests	Computer Network and Benefits	Classification of Network	Network Features

Theory:

Chapter	Topic and Contents	Hours	Marks
01	**Topic 1] Motherboard and Peripherals** **Specific Objectives:** ➢ **Identify different components and their function on motherboard** ➢ **Identify and compare storage devices** ➢ **Write specifications, select appropriate monitor and compare LCD and CRT monitors** ➢ **Understand principle, construction and working of peripherals** **Contents:** • Different types of PC configurations and their comparison, • Chipset basic, Architecture of Intel 945 G • Overview and features of ISA, PCI-X, PCI-Xpress • Overview features and types of DDR RAMs, Concept of cache memory : Internal cache, External cache (L1, L2, L3 cache), BIOS Basics • CD/DVD ROM drive : Construction, recording, comparison • LCD monitor: functional block diagram of LCD monitor, working principle, Types-Passive matrix and Active matrix. Important characteristics - Resolution, Refresh rate, Response time. Comparison of CRT display and LCD display • Construction, working & Installation of Keyboard, mouse, scanner and printer. Keyboard: Membrane and mechanical only. Mouse: Optical only, Scanner: Flatbed only, Printer: Dot matrix, Inkjet, and Laser only	10	14
02	**Topic 2] Power Supply and Interfaces** **Specific Objectives:** ➢ **Select, identify, measure and troubleshoot power related problems** ➢ **Differentiate online and offline UPS.** ➢ **Identify, select and use different interfaces** **Contents:** 2.1 • Block diagram and working of SMPS, Signal description and pin diagram of ATX power supply. • UPS : Block diagram working, Types, Rating 2.2 • USB features and operation, RS232: Voltages & 9 pin Signal description.	04	06
03	**Topic 3] Diagnostic, Testing and Maintenance** **Specific Objectives:** ➢ **Identify importance of preventive maintenance** ➢ **Realize the need of practices of preventive maintenance of peripheral** **Contents:** • Maintenance : Preventive and passive maintenance • Preventive maintenance of peripherals of PCs: Mouse, keyboard, hard disk, CDROM drive, laser printer, scanner.	04	08

	• PC problems and troubleshooting, POST.		

04	**Topic 4] Introduction to Networks**
	Specific Objectives:
	    ➢ **Classify types of networks**
	    ➢ **Plan and design network**
	    ➢ **Install, configure and use networking devices**
	    ➢ **Test and maintain networks**
	Contents:
	• Network classification: LAN, WAN, MAN. Peer to peer and client server networks
	• Network topology, Benefits of networks
	• Network cables- coaxial, UTP, STP, fiber optics their comparison and characteristics
	• Network standards- Ethernet, Ring, Token, wireless
	• Principle, operation and function of Hubs, Switches, Routers, Bridges, Repeaters, Gateways, firewalls
		06	10

05	**Topic 5] Networking Devices and Reference Models**
	Specific Objectives:
	    ➢ **Understand layered approach**
	    ➢ **Compare TCP-IP and OSI models**
	    ➢ **Setup and configure network in laboratory environment**
	Contents:
	• OSI Reference Model - Interlayer Communication - Data Encapsulation, Functions of each layer.
	• TCP/IP Reference Model - Link, Internet, Transport, Application layer.
	• Comparison of the OSI and TCP/IP reference models
	• TCP/IP Protocols - IP, ICMP, ARP, TCP, FTP and UDP.
	• IP Addressing - IP Address Assignments, IP Address Classes, Subnet Masking.
	• TCP/IP Configuration - Installing the TCP/IP Protocol; Configuring TCP/IP - Configuring Basic TCP/IP Properties, Configuring Advanced TCP/IP Properties
		08	12

	Total	**32**	**50**

Skills to be developed:
Intellectual Skills:

1. Identify and select appropriate peripherals
2. Plan schedule for preventive maintenance of computer systems and network
3. Test and troubleshoot the problems in computer systems
4. Plan, analyze, design, configure networking systems
5. Select different hardware and software diagnostic tools of networking.

Motor Skills:

1. Handling of computer system and peripherals
2. Assembly of computer systems
3. Install and testing of network components
4. Crimping of cables.

List of Practical:

1. Identity and understand different components of motherboard.
2. Identify & understand the different types of Keyboard, Mouse & troubleshooting procedure.
3. Understand different components of Hard Disks drive as a storage device & terms related to it.
4. Understand formatting and partitioning of Hard Disk.
5. Identify and Install various types of Display Adapters.

Practice Exercise

6. Install and understand the working of Scanner and Troubleshooting.
7. Install and understand the working of MODEM.
8. Understand the ATX Power Supply and SMPS.
9. Identify various types of Printer and perform Installation.
10. Indentify and understand different types of Network Cable.
11. Installation of Client Server Network in Lab. Exercise on objectives. (As an assignment)

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
01	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	Willey Publication
02	Scott Mueller	Upgrading & Repairing PCs	Pearson Education
03	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
04	William Stalling	Local and metropolitan Area Networks 6/e	Pearson
05	Douglas E Comer & M S Narayanan	Computer Networks and Internet	Pearson

Websites:
ccna.com
ccna.com/ccna-training
learningnetwork.cisco.com
www.mcse-training.com
www.microsoft.com/learning/en/us/certification/mcse.aspx
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