



COMPUTER HARDWARE AND NETWORKING

Week No.	PRACTICAL	THEORY	O/P 1	O/P 2
1	<p><u>Familiarization with the Institute and Safety</u></p> <p>a) Visits to workshops, labs, office, stores etc., of the institute.</p> <p>b) Demonstration of safety precaution.</p> <p>c) Demo of first aid practice.</p> <p>d) Demo of artificial respiration and practice.</p> <p>e) Demo of electrical safety precautions.</p>	<p>a) Punctuality and Discipline expected of trainees. Course duration, methodology and structure of the training program.</p> <p>b) About the institute and infrastructure.</p> <p>c) Safety in moving and shifting heavy and delicate equipments.</p> <p>d) First aid.</p> <p>e) Artificial respiration.</p> <p>g) Electrical safety.</p>		
2	<p><u>Basic concepts of Electricity –</u></p> <p>a) Identify specification of types of fuses. Identification and specification of type of switches.</p> <p>b) Identification of meter types and measuring range.</p> <p>c) Construct a simple circuit using AC/DC supply, lamp, fuse and switch..</p> <p>d) Measure circuit voltage and current using voltmeters</p>	<p>a) Concept of current and voltage. AC, DC Supply indicating lamps. Different types of Fuses and their applications. Different types of connectors used in electrical and electronic applications. Different types of switches used in electrical and electronic applications.</p> <p>b) Circuit voltage and current. Measuring circuit voltage and current using voltmeters and ammeters. AC and DC meters.</p> <p>c) Measuring instruments, MC, MI type, Ammeter, Voltmeter, Multimeter for measuring voltage and</p>	<p>Free hand sketching of straight lines, rectangles, square, circles, polygons, etc.</p>	<p>Electricity: Negative & positive polarities, structure of Atoms, Electrons & protons, coulomb, unit of charge, volt, unit of potential difference, and charge in motion is current.</p>

	<ul style="list-style-type: none"> • <i>What one shouldn't wear while working inside a computer</i> • <i>The danger of static electricity</i> • <i>How to protect a PC from lightning strikes and power outages</i> 	<p>components, cards, boards inside a PC(to card or device level only).</p> <p>c) Types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC.</p> <p>d) Precautions to be taken while removing and/or re-connecting cables inside a PC.</p>		
12-13	<p><u>Hardware Identification</u></p> <ul style="list-style-type: none"> • <i>Identify the front and rear panel controls and ports on a PC</i> • <i>Cases</i> • <i>Cooling</i> • <i>Cables & Connectors</i> • <i>Power Supplies</i> • <i>Power Supply Connections</i> • <i>Motherboard Connections</i> • <i>Motherboard Components</i> • <i>CPU (Processor)</i> • <i>RAM (Memory)</i> • <i>Hard Drive Connections</i> • <i>Mechanical vs. Solid State Drives</i> • <i>ROM Drives</i> • <i>Video Cards</i> • <i>Sound Cards</i> <p>Use Of Debug Card Post Error & Code, SMPS Tester, PCI slot testing tool.</p>	<p>(a) <i>Types of I/O devices and ports on a standard PC for connecting I/O devices.</i></p> <p>b) <i>Function of keyboard, brief principle, types, interfaces, connectors, cable.</i></p> <p>c) <i>Function of Mouse, brief principle, types, interfaces, connectors, cable.</i></p> <p>d) <i>Function of monitor, brief principle, resolution, size, types, interfaces, connectors, cable.</i></p> <p>e) <i>Function of Speakers and Mic, brief principle, types, interfaces, connectors, cable.</i></p> <p>f) <i>Function of serial port, parallel port, brief principle of communication through these ports, types of devices that can be connected, interface standards, connectors, cable.</i></p> <p>g) <i>Precaution to be taken while connecting/removing connectors from PC ports. Method of ensuring firm connection.</i></p>	Front and Rear view of a PC	Alternating voltage and current: AC fundamentals, RMS, Average values.
14-15	<p><u>Hardware Remove-Test-Replace/ Install</u></p>	<p><i>Types of Processors and their specifications (Intel: Celeron, P4 family, Xeon,</i></p>	Explanation of simple orthographic	Arithmetic and geometric

	<ul style="list-style-type: none"> • Removing RAM • Installing RAM • Removing a ROM Drive • Installing a ROM Drive • Removing a Hard Drive • Installing a Hard Drive • Defects related to SMPS, its cable, connector and servicing procedure. • Removing a Power Supply • Installing a Power Supply • Removing a Video Card • Installing a Video Card • Install Expansion Cards • Removing Fans • Installing Fans • Removing the Motherboard • Installing the Motherboard • Removing the Processor • Installing the Processor • Installing a CPU Cooler • Troubleshooting • Checking the Power Switch • Removing the CMOS Battery • Seating Expansion Cards 	<p><i>dual core, quad core, core 2 duo, i3, i5, i7 and AMD).</i></p> <p>a) Memory devices, types, principle of storing. Data organization 4 bit, 8 bit, word.</p> <p>b) Semiconductor memories, RAM, ROM, PROM, EPROM, EEPROM, Static and dynamic.</p> <p>c) Example of memory chips, pin diagram, pin function of</p> <p>b) Concept of track, sector, cylinder. FD Drive components- read write head, head actuator, spindle motor, sensors, PCB.</p> <p>c) Precaution and care to be taken while dismantling Drives.</p> <p>d) Drive bay, sizes, types of drives that can be fitted. Precautions to be taken while removing drive bay from PC.</p> <p>f) HDD, advantages, Principle of working of Hard disk drive, cylinder and clusture, types, capacity, popular brands, standards, interface, jumper setting.</p> <p>Drive components- hard disk platens, and recording media, air filter, read write head, head actuator, spindle motor, circuit board, sensor, features like head parking, head positioning, reliability, performances, shock mounting capacity. HDD interface IDE, SCSI-I/2/3 comparative study. Latest trends in interface technology in PC and server HDD interface.</p> <p>g) Precautions to be taken while fitting drives into bays and bay inside PC cabinet.</p> <p>h) CMOS setting.(restrict to drive settings only).</p>	<p>projection 3^{rd} angle.</p>	<p>progression , sum of n terms, simple calculations</p>
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		<p>i) Meaning and need for using Scan disk and defrag.</p> <p>j) Basic blocks of SMPS, description of sample circuit.</p>		
16-17	<p><u>Windows Installation</u></p> <p>A walkthrough of installing Windows 7 / 8</p> <p>A walkthrough of installing Windows XP</p> <p>Imaging: create a Windows system image</p> <p>How to Backup/Restore your Windows partition with the bootable image disk</p> <p>Duplicating a partition (creating a multiboot system)</p> <p>A multiboot system: the Windows bootmanager vs. an alternative bootmanager</p> <p>Setting up a multiboot/dualboot system</p> <p>Dual Boot Ubuntu and Windows</p> <p>Windows XP registry tweaks</p>	<p>Types of software. System software-OS, Compiler. Application software-like MS office. High level, low level language, Computer application scientific industrial and business. Functions of an operating system. Disk operating system.</p> <p>a) . Concept of GUI, Modes of starting on different occasions.</p> <p>b) Desktop, Icon, selecting, choosing, drag and drop.</p> <p>c) My computer, network neighbourhood/ network places.</p> <p>d) Recycle bin, briefcase, task bar, start menu, tool bar, and menus.</p> <p>e)Windows Explorer.</p> <p>f) Properties of files and folders.</p> <p>g) Executing application programs.</p> <p>h) Properties of connected devices.</p> <p>i) Applications under windows accessories.</p> <p>j) Windows Help.</p> <p>k) Finding files, folders, computers.</p> <p>l) Control panel. Installed devices and properties.</p>	Block Diagram, Front and Rear view of a monitor,.	Problems of binary addition, decimal to binary, binary to decimal, decimal to hexadecimal, hexadecimal to decimal.
18	<p><u>Data Backup</u></p> <ul style="list-style-type: none"> • 3 types of media to use when backing up your data, and when each method is appropriate • How to create 	<p>Utilities for recovering data from defective/bad hard disks.</p> <p>a) Introduction to removable storage devices, Bulk data storage devices-magnetic, optical, magneto optical drives, WORM drives.</p> <p>b) CD ROM drives-Technology, Types of CD</p>	Connections of a Computer	Binary addition and subtraction.

	<p>automated backups to ensure you always have a recent backup</p> <ul style="list-style-type: none"> • Learn how to manually backup data • How to make an exact copy (clone) of a hard drive <p><u>Hardware Troubleshooting</u></p> <ul style="list-style-type: none"> • The danger in not diagnosing problems first • Learn how to test your RAM • Check your hard drive for errors <p><u>PC Cleaning</u></p> <ul style="list-style-type: none"> • The best cleaning supplies to use • How to increase airflow and increase your computer's lifespan • How to clean your computer 	<p>drives, working principle application.</p> <p>c) Minor repairs and maintenance of CD ROM drives.</p> <p>d) Technology, working principle, capacity, media of ZIP drives.</p> <p>e) Important parts and functions of a ZIP drive.</p> <p>f) Minor repairs and maintenance of ZIP drive.</p> <p>g) Technology, working principle, capacity, media of DAT Drive and back-up procedures.</p> <p>h) Important parts and functions of DAT drive.</p> <p>i) Minor repairs and maintenance of DAT drive.</p> <p>j) Technology, working principle, capacity, media of DVD ROM drive .</p> <p>k) Important parts and functions of DVD ROM drive.</p> <p>l) Minor repair works on a DVD ROM drive.</p> <p>m) Technology, working principle, capacity, media of CD WRITER and use different modes of writing on a CD. Using of utility for CD writing.</p> <p>n) Minor repair works on a CD WRITER.</p> <p>o) Technology, working principle, capacity, media of Magneto- Optical Disk (MOD) drives. Applications.</p> <p>p) Important parts and functions of MOD drive.</p> <p>q) Minor repair works on MOD.</p> <p>r) Latest trends in backup devices/media.</p>		
19	<p><u>Hard Drives</u></p> <ul style="list-style-type: none"> • Partitioning hard disk (primary and extended partitions) 	<ul style="list-style-type: none"> • What's Inside a Hard Drive? • How Hard Disks Work • Inside: Hard Drive Motherboard 	Diagram of a Hard disk, diagram of internal components and structure.	Calculation of Hard disk capacity, Read /write time, latency time, seek time.

	<ul style="list-style-type: none"> • Hard Drive Failures • How To Troubleshoot a Noisy Hard Drive • How to Format a Hard Drive • How to Completely Erase a Hard Disk Drive • Installation and configuration of storage devices. Integration of PATA and SATA drivers. • Recover emails, files, and data from a crashed hard drive or computer <p><u>Virus Removal</u></p> <ul style="list-style-type: none"> • How to run a full system scan • How to fix your browser from redirecting to other websites (browser hijack) • Using a modern anti-virus utility • When utilities don't fix everything, how to manually remove a virus • 2 specific things to disable when trying to get rid of a nasty virus • 2 special utilities that work wonders 	<ul style="list-style-type: none"> • Desktop Hard Drive Buyer's Guide • What is RAID? Using Multiple Hard Drives for Performance and Reliability • Partitioning hard disk (primary and extended partitions) • Learn how to prevent your PC from getting malware • All the different types of malware and how they attack your PC <p>The difference between Anti-Virus and Anti-Spyware software</p>		
20	<p><u>System Utilities</u></p> <ul style="list-style-type: none"> • How to check to see if your hard drive has bad sectors • Fix the master boot record • How to run an in-place installation • Using Task Manager and event 	<p>Bad Sectors in Hard disk, Master Boot Record, in-place installation, Registry fixing, performance level check, Shortcut fixing, Fixing Startup process, log, etc.</p> <p>Users and user account. Privileges, scope, permissions etc. Concept of Virtual</p>	<p>Pin diagram and block diagram of RAM, ROM, EPROM, Dynamic ROM Chips.</p>	<p>Definition of Scalar and Vector, notations.</p>

	<p>viewer.</p> <ul style="list-style-type: none"> • Using System Monitor and Performance Logs. • Configure config.sys file. <p><u>User Account Customization</u></p> <ul style="list-style-type: none"> • How to create and configure user accounts in Windows XP, Vista, 7/8 • Make Changes to an Account • Changing the storage location of the personal folders • Changing the storage location of installed software • Setting up Parental Controls in Windows XP, Vista, 7, 8 • How to Use Fast User Switching in Windows • View Hidden Files and Folders • Lock Down Windows 7 / 8 With User Account Control • How to Delete User Accounts in Windows 	<p>Machine.</p>		
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<p>21</p>	<p><u>Windows Update & Device Driver</u></p> <ul style="list-style-type: none"> • How to find your system version in Windows, Linux • Installing a service pack • How to perform a Windows Update <p><u>Software Installation</u></p> <ul style="list-style-type: none"> • Installing a software program in windows • How to run a file from MS-DOS • Extracting or uncompressing a compressed file • How to compress or make files into one file • Extracting files from the Windows cabinets • Uninstalling Windows software • Unable to remove a program from Windows Add/Remove programs 	<p>Version of a software, Service pack, Updating of OS, Different configurations of Computer system and its peripherals, Compatible with different hardware/software.</p> <p><u>Software Installation</u> –</p> <p>Pre-installation - Prerequisites, Install procedure, Rollback or Un-install procedure, Tests.</p> <p>Post-installation – Backup procedure & specifications, Restore procedure, Periodical view check.</p> <p>Awareness of legal aspects of using computers such as copyright, patent etc.</p>	<p>Diagram of servo motor and stepper motor with external connections</p>	<p>Addition and subtraction of vectors.</p>
<p>22</p>	<p><u>Installing Hardware Drivers</u></p> <ul style="list-style-type: none"> • How To Update Drivers in Windows • How To Roll Back a Driver in Windows • Familiarization with Device manager. • Interfacing with cellphone, tablet PC, synchronization of contacts. 	<ul style="list-style-type: none"> • What is a Driver? • What hardware device drivers should be updated • What is a Device manager? <ul style="list-style-type: none"> • Computer Maintenance Tips and Tricks to Backup, Scan and Clean <p>Power on self test, Peripheral diagnostics, general purpose diagnostics, Operating system diagnostics. Hardware boot process, Windows boot process.</p>	<p>Top view of a motherboard showing chip set and slots etc.</p>	<p>Scalar and cross product. Simple problems</p>

	<p><u>Windows Utilities</u></p> <ul style="list-style-type: none"> • How to Repair Corrupted Files Problems • How to check for corrupted files • Restore your machine back to normal • Hard disk is filling up, what should one do? • Where's the disk space ? • Top 15 Ways to Speed Up the Computer • How to Automatically Clean and Organize the Desktop, Downloads, and Other Folders • 5 Simple Rules To Keep Files Organized • 5 Reasons - Computer Is Running Slow 			
23	<p><u>Junk File Removal</u></p> <ul style="list-style-type: none"> • How to Remove Junk Files • How to completely remove "deleted" files • How to clear web browser cache firefox, ie, chrome, • 5 steps to clean up your computer files • Personalize your Windows XP-based PC <p><u>Linux OS</u></p> <ul style="list-style-type: none"> • Using a Linux Live CD • Why you want a Linux Live CD • Use Ubuntu Live 	<p>Junk files, deleted files, configuration of internet browser.</p> <ul style="list-style-type: none"> - Introduction to UNIX/LINUX and its structure. - Files and Processes in Linux. - Directory structure of Linux O.S. <p>Outlook – Add and use contacts, Calendar basics, Recall and replace sent messages, Send automatic replies when you're out of the office, The ins and outs of BCC, Use Instant Search to find</p>	<p>Diagram of different connectors, CPU sockets.</p>	<p>AC circuits: Power, VA, KVA, Watts, KW, related exercise, power factor.</p>

	<p>CD to Backup Files from Your Dead Windows Computer</p> <ul style="list-style-type: none"> • Using a liveCD as your Linux Desktop <p><u>Outlook Configure & Backup</u></p> <ul style="list-style-type: none"> • Configure outlook • Backup and Restore Outlook • How to restore the Outlook default installation, toolbars and settings • Restore Deleted Items from an Outlook PST-file 	<p>Calendar items, Use Instant Search to find contacts, Use Instant Search to find messages and text, Add holidays to your calendar, Create or delete a search folder, Import and export vCards to Outlook contacts, Make the switch to Outlook 2013, Reach out with contact groups (distribution lists), Send or delete an email stuck in your outbox, Take calendars to the next level, Track email with read receipts, Password protect your mailbox, Use rules to manage your email.</p>		
24	<p><u>Laptop PCs :</u></p> <ul style="list-style-type: none"> • Identification of laptop sections and connectors. • Assembling and disassembling a Laptop. • Checking of various parts of a laptop. • Checking of batteries and adaptors. • Replacing different parts of laptops. • Upgrading RAM, HDD and other parts. • Testing, fault finding and troubleshooting techniques. • POST codes and their meaning, fixing of problems based on codes. • Enabling support for SATA technology. • Installation of OS 	<ul style="list-style-type: none"> • Introduction of laptop and comparison of various Laptops. • Block diagram of laptop & description of all its sections. • Study of parts of a laptop. • Input system: Touchpad, Trackball, Track point, Docking station, Upgrade memory, hard disk, replacing battery, Configuring wireless internet in a laptop, • Latest Tools & Gadgets For Desktop/Laptop Repairs 	<p>Front and Rear view of a Laptop PC.</p>	<p>Diodes: Rectifier, peak voltage, PIV, Rectifier efficiency.</p>

	<p>using SATA technology drivers.</p> <ul style="list-style-type: none"> • Laptop troubleshooting • Latest Tools & Gadgets For Desktop/Laptop Repairs 			
25	<p><u>Word Processing & Spreadsheet Software:</u></p> <p>a) Creating and saving document files using Word Processing Software.</p> <p>b) Formatting text and editing.</p> <p>c) Setting page and margins. Tabs and indents.</p> <p>d) Creating multicolumn documents.</p> <p>e) Inserting pictures in documents.</p> <p>f) Creating tables.</p> <p>g) Creating different types of documents.</p> <p>h) Saving word documents in other formats.</p> <p>i) Mail merge.</p> <p>j) Printing documents.</p> <p>k) Creating Worksheets using Spreadsheet Software.</p> <p>l) Formatting cells.</p> <p>m) Using formula in cells.</p> <p>n) Creating simple spreadsheet for an application.</p> <p>o) Creating relation between</p>	<p>a) Introduction to word processing and comparison of features. Creating and saving document files using Word Processing Software.</p> <p>b) Formatting text and editing.</p> <p>c) Setting page and margins. Tabs and indents.</p> <p>d) Creating multicolumn documents.</p> <p>e) Inserting pictures in documents.</p> <p>f) Creating tables.</p> <p>g) Creating different types of documents.</p> <p>h) Saving word documents in other formats.</p> <p>i) Mail merge.</p> <p>j) Printing documents.</p> <p>k) Introduction to spread sheet.</p> <p>Creating Worksheets using Spreadsheet Software.</p> <p>l) Formatting cells.</p> <p>m) Using formula in cells.</p> <p>n) Creating simple spreadsheet for an application.</p> <p>o) Creating relation between sheets.</p> <p>p) Graphs and tables.</p> <p>q) Advanced features.</p> <p>r) Printing spread sheets.</p>	<p>Flow charts showing steps in sample programs.</p>	<p>Voltage regulators, Voltage doublers, multipliers, Clipper circuits, related exercise.</p>

	sheets. p) Graphs and tables. q) Advanced features. r) Printing spread sheets.			
26	EXAMINATION			

Week No.	Practical	Theory		
27	<u>Linux operating system</u> - Installing UNIX / LINUX - Preparing functional system UNIX/LINUX - Adding new users, software, material components - Making back-up copies of the index and files - Dealing with the files and indexes	<u>Linux operating system</u> - Basic Linux commands. - Linux file system, The Shell, Users and file permissions, vi editor, X window system, Filter Commands, Processes, Shell Scripting.	Use of drawing instruments, 'T' square, drawing board, construction of simple figures & solids with dimensions, use of different types of scales in inch & millimeters, lettering numbers & alphabets. Diagram of Linux file system.	Entrepreneurship and financial assistance from financial institutions.
28-30	<u>Printers & Plotters</u> a) Testing front panel controls. Interface pins, cables, measurement of voltages and waveforms. b) Installing a printer and carrying self- test.	a) Types of printers, Dot Matrix printers, laser printer, Ink jet printer, line printer. Block diagram and function of each unit head assembly, carriage, and paper feed mechanism. Front panel controls and interfaces. Pin details of interface port. b) Installation of a printer	Block diagram of different types of printers. Showing various functional units	Selection, Estimation of time and spares for servicing jobs.

	<p>c) Replacing ribbon in a DMP. d) Refilling ribbon tape of DMP. e) Testing and Rectifying defective cable. f) Removing and cleaning printer head. g) Replacing a new printer head. h) Testing and servicing Printer power supply. i) Changing rollers and other mechanical parts. j) Tracing the control board and identifying defective components. Servicing of control board. k) Replacement of toner cartridge of laser printers. l) Refilling toner cartridge of laser printers. m) Drum cleaning and replacement in of laser printers. n) Testing and servicing Printer power supply of laser printers. o) Changing mechanical parts of laser printers. p) Tracing the control board circuit and identifying defective components. Servicing of control board of laser printers. q) Replacement of ink cartridge of deskjet/inkjet printers. r) Refilling ink cartridge of</p>	<p>driver. And self test. c) Ribbon types used. d) Refilling of ribbons. e) Printer cable testing defects, effect and servicing. f) Printer head, types, cleaning procedures. g) Precaution to be taken while removing and replacing printer head assembly. h) Pinter power supply, circuit analysis, defects, servicing. i) Carriage motor assembly, paper feed assembly, sensors . Procedure for dismantling and replacing mechanical parts. j) Printer control board, circuit, function, probable defects, servicing. k) Working principle of LASER printer. l) Toner cartridge, types, replacing toner cartridges m) Refilling toner cartridges, equipment available for refilling and procedure. n) Printer drum, function, cleaning and replacing procedure. o) Power supply in laser printers, circuit, defects, servicing. p) Mechanical parts and sensors on laser printer, function, replacement procedure. q) Control board(s) in laser printer, circuit diagram, defects and servicing procedure. r) Working principle of INK JET/Deskjet printers. Type of ink used and replacement of ink cartridge. s) Refilling of ink, equipment available, quality of refilled cartridges. t) Printer drum, function, cleaning and replacing procedure. u) Power supply in inkjet</p>		
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	<p>deskjet/inkjet printers.</p> <p>s) Drum cleaning and replacement in deskjet/inkjet printers..</p> <p>t) Testing and servicing Printer power supply of deskjet/inkjet printers..</p> <p>u) Changing mechanical parts of deskjet/inkjet printers..</p> <p>v) Tracing the control board and identifying defective components.</p> <p>Servicing of control board of deskjet / inkjet printers.</p> <p>w) Connecting and using high speed line printers.</p> <p>x) Replacing spares of line printers.</p> <p>y) Self test procedures in printers.</p> <p>Use of diagnostics software for serving printers.</p>	<p>printers, circuit, defects, servicing.</p> <p>v) Mechanical parts and sensors on inkjet printer, function.</p> <p>w) Working principle of Plotter and its common faults.</p>		
31-32	<p><u>Scanner & MFD</u></p> <p>Scanner – Installation, configuration, using Automatic Document Feeder(ADF), OCR.</p> <p>Barcode Scanner – Installation and configuration.</p> <p>Network Scanner – Installation and configuration.</p> <p>Troubleshooting of Scanner.</p> <p>Multifunction Printer – Installation, Replacing supplies and spares, troubleshooting,</p>	<p>Working principles of Scanner, Barcode Scanner, Network Scanner.</p> <p>Working principles of Multifunction Printer, Passbook printer, High Speed Printer, Line Printer, Network Printer.</p> <p>Print Server.</p>	<p>Block diagram of different types of Scanners and MFDs. Showing various functional units</p>	- Do -

	<p>Passbook Printer – Installation, calibration, configuration & troubleshooting. Replacement of Supplies and maintenance.</p> <p>Network Printer – Installation and configuration, troubleshooting.</p> <p>How to update the flash of Motherboard, printer, scanner and modem etc.</p>			
33	<p><u>Components of the Computer Network.</u></p> <p>Familiarization with various Network devices, Connectors and Cables.</p> <p>Understanding the Layout of network.</p>	<p>Introduction to Computer Networks – Advantages of Networking, Peer-to-Peer and Client/Server Network.</p> <p>Network Topologies – Star, Ring, Bus, Tree, Mesh, Hybrid.</p> <p>Type of Networks – Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN) and Internet, Ethernet, Wi-Fi, Bluetooth, Mobile Networking, Wire and wireless Networking.</p> <p>Difference between Intranet and Internet.</p>	<p>Block diagram of different types of network and network devices.</p> <p>Block diagram of different network topologies.</p>	<p>Quality control standard and institutions.</p> <p>Warranty & Guarantee and their differences.</p>
34-35	<p><u>Crimping & Punching</u></p> <p>Crimping practice with straight and cross CAT 5 cables.</p> <p>Punching practice in IO Box and patch panel.</p> <p>Crimping and making cables.</p>	<p>Communication Media & Connectors – Unshielded twisted-pair (UTP), shielded twisted-pair (STP), Fiber Optics and coaxial cable: RJ-45, RJ-11, BNC.</p> <p>Understanding color codes of CAT5 cable. 568A and 568B convention.</p>	<p>Diagram of different Network cables and connectors.</p>	<p>Standards of Cables and connectors.</p>
36	<p><u>Cabling</u></p> <p>Create cabling in a lab with HUB/Switch and IO Boxes and patch panel. Fitting Switch Rack.</p>	<p>Introduction to Data Communication – Analog and Digital Signals, Simplex, Half-Duplex and Full-Duplex transmission mode.</p>	<p>Diagram of different tools to setup a computer network.</p>	<p>Calculation of Network Speed. Bandwidth, Baud Rate, Half Duplex and full duplex.</p>

37	<p><u>Install & configure a Network.</u> Installing & Configuring a Peer-to-Peer Network using Windows Software. Making cables by crimping. Connect computers using Bluetooth.</p>	<p>OSI Model - The functions of different layers in OSI model</p>	<p>Diagram of OSI layers.</p>	<p>Layer wise network equipment, accessories and protocols.</p>
38-39	<p><u>Configuration of Data . communication equipments.</u> Connecting computers with Network with Drop cable and using Wi Fi configuration.</p> <p>Basic Programmable switch Configuration Spanning Tree Protocol (STP) Command Line Interface IP Routing Process Verifying Configuration</p>	<p>Network Components – Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches, Access point, etc. – their types, functions, advantages and applications. IP Routing in Network RIP IGRP</p>	<p>Diagram of a basic and advanced wi-fi network.</p>	<p>Protocols, transmission and reception process, speed.</p>
40	<p><u>IP Addressing & TCP/IP</u> IP Addressing technique(IP4/IP6) and Subnetting and Supernetting the network. Installation and Configuration of TCP/IP Protocol. Practice TCP/IP Utilities : PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT etc.</p>	<p>Protocols, TCP/IP, FTP, Telnet etc., Theory on Setting IP Address(IP4/IP6) & Subnet Mask, Classes of IP Addressing.</p>	<p>Diagram of subnet and supernet.</p>	<p>IP Addressing and subnetting.</p>
41	<p><u>Other Network Protocols</u> Working with SMTP, TELNET, FTP, HTTP, SNMP, LDAP etc. Practice on configuring DHCP.</p>	<p>Simple Mail Transfer Protocol (SMTP), Telnet, File Transfer Protocol (FTP), Hyper Text Transfer Protocol (HTTP), Simple Network Management Protocol</p>	<p>Block diagram of different types of internet protocol system.</p>	<p>- Do -</p>

		(SNMP). LDAP(Lightweight Directory Access Protocol). Introduction to Network Security. Concept of Dynamic Host Control Protocol.		
42-43	<u>Sharing Resource & Internet connection.</u> Sharing Resource and Advance Sharing Setting. Installing Proxy Server. Exposure and using Internet. Setting E-mail accounts. Conferencing. Installing and Configuring Internet Connection on a PC using Broadband or Dongle.	Concept of Internet. Architecture of Internet. DNS Server. Internet Access Techniques, ISPs and examples(Broadband/Dialup/Wifi). Concept of Social Networking Sites, Video Calling & Conferencing. Concept of VIRUS and its Protection using Anti Virus, UTM and Firewall.	Diagram of distributed networking.	DSL Speed Calculation.
44	<u>Network Protection and troubleshooting.</u> Setting up basic protection using public keys and MAC address filters. Integrate wired with wireless network. Power over Ethernet(PoE). Troubleshooting wired and wireless network.	Collaborating using wired and wireless networks, Protecting a Network, Network performance study and enhancement.	Schematic diagram of network models with different configuration	Standards of Wi-fi Network. Antenna and its types.
45	<u>Control & monitoring of network devices.</u> Setting up of basic collaboration tool like NetMeeting for activities like chat, application sharing, remote desktop access and control, VoIP. Setup IP camera for basic surveillance scenario, logging and monitoring of devices / locations. Use Linux Network Tools to check / maintain / Manage	Surveillance using network devices, collaboration on network for team optimization and support activities. Remote management of devices.	Block Diagram of Surveillance System.	Industrial Acts.

	Network.			
46-47	<p><u>Install and configure Windows Server</u> Configure services like Active Directory, DNS and DHCP. Configuration of broadband modem and sharing internet connection.</p>	<p>Server concepts, Installation steps, configuration of server. Concept of Active Directory and DNS. Setting up of DHCP, Routing and remote access.</p>	<p>Diagram of a Centralised Networking, Client-Server network diagram.</p>	<p>Data communication Techniques. CSMA / CD.</p>
48	<p><u>Network Security</u> Practice on firewall technologies to secure the network perimeter. Practice LAN security considerations and implement endpoint and Layer 2 security features. Wi-fi configuration to implement security considerations.</p>	<p><u>Network Security</u> Modern Network Security Threats and the basics of securing a network. Secure Administrative Access, LAN security considerations. Cryptography. Wi-fi security considerations.</p>	<p>Various symbols of Networking.</p>	<p>Data Encryption and Decryption Techniques.</p>
49	<p><u>Internet and Web Browser</u> Practice web browsing using popular web browsing software, Configuring web browser. Search for content using popular search engines. Use favourite folder for browsing quickly. Downloading & Printing Webpages. Using e-mail – Opening & configuring email client, mailbox: inbox and outbox, Creating and sending e-mail, Replying to an e-mail message, Forwarding and e-mail message, Sorting and searching emails.</p>	<p><u>Internet and Web Browser</u> World wide web and website Web Browsing and popular web browsing software. Introduction to Search Engines, Popular Search engines. Concept of Favourites Folder. What is an Electronic Mail. Email Addressing, BCC and CC, Inbox, Outbox, Address book, SPAM. <u>IT Act & Law</u> Introduction to Cyber Security. Introduction to Cyber Laws & IT Act. Importance of privacy and techniques to manage it.</p>	<p>Block diagram of WAN.</p>	<p>Concept of Asynchronous & Synchronous Transmission.</p>

	Sending document/softcopy by email, activating spell checking, using address book, Handling SPAM, Removal of Cookies.			
50	<u>Project Work (any one)</u> a) Disassemble a given Desktop / Laptop PC totally following the safety precautions. b) Reassemble the Desktop / Laptop PC and test for its satisfactory performance.	ITIL V3 Practices for Service Management – Service Management Concepts – Introduction, Service Strategy (SS), Service Design (SD), Service Transition (ST), Service Operations (SO), Continual Service Improvement (CSI).	Diagram related with Project	Calculation & Science related with Project.
51	c) Install Operating System and necessary driver, taking backup and restore system. d) Rectify a defective system and make it as smooth working system. e) Troubleshoot / Repair / Replace an SMPS/RAM. f) Check Hard disk error, partition, format different types of Hard disk drives.	Root Cause Analysis(RCA) – Definition, Four major steps – Data collection, causal factor charting, root cause identification, recommendation generation and implementation. Root cause map, Root cause summery table. Cause & Effect diagram (fishbone diagram), 5 why's or Gemba Gembutsu.	- Do -	- Do -
52	EXAMINATION			