

IRDT KANPUR

**CURRICULUM  
OF  
PG DIPLOMA  
IN  
COMPUTER HARDWARE AND NETWORKING  
(One Year)**

(Revised Syllabus)

Institute of Research ,Development& Training

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## **Main Features of Curriculum**

1. **Title of the course** : **PG Diploma in Computer  
Hardware & Networking**
2. **Duration of Course** : **One Year**
3. **Type of the course** : **Full time**
4. **Pattern of course** : **Semester**
5. **Intake** : **60**
6. **Admission Qualification** : **Graduate in any Discipline**

## **I. NEED ANALYSIS :**

With the development of civilization, human needs to keep on increasing their fulfillment needed simulation, analysis of lot of information's too became essential. Now the individual responsibilities of every responsible citizen grew up to such a light that it is difficult for him to handle them successfully. Human memory too has its own limitations. So here comes the computer to help in all kind of decision making, whether it is highly complicated research work, war strategy, market speculations or day-to-day need of human life etc. As a matter of fact every individual activity needs decision making. So the computer is the need of organizations and also the need of individual being. With PCs penetrating every area of life, wide proliferation of internet and networking, It will not be exaggeration if we say that it is "Computer era".

So is the need for developing a course for computer field at diploma level. The course aims to develop personals, capable of taking responsibilities such as installation, repair and maintenance, networking, security administration and operating computer units. It is supposed that such personnel will not face any dearth of employment because of omnipresent nature of computer. Major areas being Hardware industry, Infrastructure Managed Services, BPO's, IT, Telecom, Banking & Financial sectors, Manufacturing Sectors.

The syllabus for diploma in computer Hardware & Networking has been developed to meet above mentioned aims. Obviously achievement of any aim requires knowledge of the means and procedures of thierutilisation. With this view various courses have been carefully selected and their length and depth decided by experienced experts in the field.

## **II. JOB POTENTIAL/JOB OPORTUNITIES**

### **JOB POTENTIAL**

Background Information Regarding Computer Industry: Most of the industries in Computer area are in private sector. The job designations are not standard. They change from firm to firm depending upon the size of firm and the nature of work, the firm is engaged in R & D or marketing software development etc. In general the jobs for a diploma holder in Computer engineering are available in the following areas :

- i. Service Division.  
Maintenance, service and installation of computer system.
- ii. Production and Quality Control Division.
- iii. Marketing division.
- iv. Commercial (stores, purchase and pricing)
- v. Research and Development.
- vi. Network Administration & Security

## JOB OPPORTUNITIES

The possible job opportunities for the product of this curriculum are :

1.3.1. Junior engineer/Design Assistant/Senior Technical Assistant in R&D, Quality Control and Testing activities.

1.3.2. Shopfloormanager/Assembly supervisor in manufacturing and production Activities.

1.3.3. Installation Engineer/Service Engineer/Junior Engineer/ Junior Service Engineer in installation, Service and Custom Support Activities.

1.3.4. Junior Marketing Executive/Junior Purchase Officer/Junior Stores Officer in Marketing and Commercial activities

1.3.5 Network Engineer/ Network & Security Administrator

## III ACTIVITIES/JOB DESCRIPTION

### Service Division:

Maintenance, service and installation of computer systems identify hardware and software faults and rectify them.

Suggests the desirable changes in the design in view of this maintenance Experiences.

Rectify fault by component and card level.

Advise the customer on site preparation and check the site.

Install the systems and test its operation.

Train the customer in the operation and the use of the system.

Help Desk Services, Server Management, Database/Security/ Web server Administration Networking

### Production and Quality Control:

Indenting the material from stores and schedule the work of skilled workers.

- Fault finding in assembly work by visual inspection.
- Guiding skilled workers in component identification, component testing and precision assembly work.
- Fabricate (if required) test and interconnect different sub-assemblies and subsystems like power supply, interface, processor and memory units, video display unit, printer, plotter, graphic monitor, hard disc drives interface etc.
- Managing personnel like technicians and skilled workers.

### Marketing:

- Meeting with prospective customer under the guidance of sales engineer.
- Arranging demonstration at the site of customer.

### Commercial:

- Assists sales engineer in the sales of computer system (Contacts customer, arranges demonstration, preparation of technical documents and specification.
- Purchase material (writes specifications, receiving quotations, prepares and checks comparative statements, checks bills).
- Prepare bill for service charges and cost of materials used.
- Incoming inspection (checking quality, quantity and specification of the material supplied against orders).
- Maintains stocks and records.

### Research & Development Work:

- Design simple microprocessor based subsystem (without optimization) under the guidance of design engineer.
- Printed circuit board (PCB) layout design under the guidance of design engineer.
- Fabricates prototype of a subsystem or system.
- Plans flow of activities for production along with engineer.
- Test systems at card level, subsystem level and at complete system level.
- Documents the layouts, circuit diagram, procedures and processes.
- Develops systems software, the line drivers and interface with the guidance from engineer and runs it.
- Communicates with engineer and assists him in converting technical ideas into practical shape.
  - Assist engineer in laying test procedures, tests standards and maintaining the quality of the products.

### IV. COURSE OBJECTIVE:

Course objectives lay the foundation for planning educational programme.

## 1. Knowledge:

1.1 He must acquire basic concepts in electronic components active as well as passive.

1.2 He must acquire basic concepts and principles of working of linear and digital circuits using discrete components and integrated circuits.

1.3 He must have the knowledge of testing procedure of active and passive components, (including integrated circuits) discrete and digital circuits by making use of different test instruments as per to their specification.

1.4 He must acquire knowledge of system block diagram and working principles of different computer peripherals.

1.5 He must acquire the knowledge of making P.C.B. layouts and learn drafting techniques.

1.6 He must acquire the knowledge of efficient use of system software by writing a small diagnostic programme to test system.

1.7 He must acquire the knowledge of working principles of the total system i.e. C.P.U., peripherals, interfaces and system software.

1.8 He must acquire the knowledge of Help Desk Services, Server Management, Database/Security/ Web server Administration and Networking .

## 2. Skill

2.1 He must acquire skill in finding faults in a computer system. The fault may be at component level or at card level or at sub system level. After finding fault he must be able to repair to it.

2.2 He must acquire skill in preparation of site for installation of a computer.

2.2 He must acquire skill in installing different subsystem (Power supply, Video display unit, C.P.U. , Printer, Plotter, Graphic monitor, Disc drives etc.).

2.4 He must acquire skill in operating and testing the working of different subsystems installed.

2.5 He must acquire skill making (or designing) layout on printer circuits board for a given electronic circuit.

2.6 He must acquire skill in fabricating (electronic circuit using different electronic components including ICs) on a printed circuit board according to a given circuit diagram.

2.7 He must acquire skill testing the performance of an electronic circuit fabricated on a printed circuit board making use of different electronic instruments.

2.8 He must acquire skill in Help Desk Services, Server Management, Database / Security/ Web server Administration & Networking

3. Attitude:

3.1 He should have open minded approach while finding fault in the system.

3.2 He should have analytical approach while dealing with any problem.

3.3 He should be a keen observer while finding fault with the system and circuits.

3.4 He should have habit of reading commercial and technical literature regarding computer.

List of experts who contributed to Change the of curriculum of One Years Diploma Course in Computer Hardware and Networking held on 7.10.2015 and 8.10.2015 at N.I.T.T.R, Chandigarh.

1. Dr. Manish Gaur H.O.D. Computer Science & Engineering  
I.E.T., Lucknow
2. Dr. A. B. Gupta Head CDC, NITTR, Chandigarh
3. ShriS.K.GuptaAsstt. Prof. CDC, NITTR, Chandigarh
4. Dr. Rakesh Kumar Asstt. Prof. CSE, NITTR, Chandigarh
5. ShriAmitDeoganAsstt. Prof. CSE, NITTR, Chandigarh
6. ShriM.P.SinghHOD(Mechanical),I.R.D.T.,Kanpur  
Bhadauria
7. ShriLitle Kumar HOD(Electronics),I.R.D.T.,Kanpur
8. Km. Kalpana Devi Asstt.Prof.I.R.D.T.,Kanpur
9. Shri G. K. KanaujiyaLecturer(IT)I.R.D.T.,Kanpur

Workshops held on 25.07.2016 in which the suggestion, contribution and support of following experts is a matter of obligation to I.R.D.T.

1. Shri Arun Kumar HOD Computer Science Engg. GGP Jhansi
2. Shri Neeraj Kumar Lecturer IT GP Kanpur
3. Shri SumitBabu Lecturer CS GP Kanpur
4. Miss Puja saxena Lecturer IT GP Kanpur
5. Shri PrashantShakya Lecturer IT GP Mahoba
6. Shri Gaurav Kishor Kanaujiya Lecturer(IT)I.R.D.T.,Kanpur



## STUDY & EVALUATION SCHEME FOR ONE YEAR PG DIPLOMA IN Computer Hardware & Networking SEMESTER SYSTEM

(Effective from session 20 -20 )

### 1<sup>ST</sup> Semester

S.No	SUBJECT	PERIOD PER WEEK		EXAMINATION SCHEME								GRAND TOTAL
		THEORY	PRAC	THEORY				PRACTICAL				
				EXAMINATION		SESS MARKS	TOTAL MARKS	EXAMINATION		SESS MARKS	TOTAL MARKS	
				DUR	MARKS			DUR	MARKS			
1.1	P C MAINTENANCE AND TROUBLE SHOOTING	--	06	--	--	--	--	03	90	40	130	130
1.2	WINDOWS AND LINUX NETWORKING	06	04	2.5	50	20	70	03	60	40	100	170
1.3	VIRTUALIZATION AND CLOUD COMPUTING	06	04	2.5	50	20	70	03	60	40	100	170
1.4	ROUTING AND SWITCHING	06	06	2.5	50	20	70	03	90	40	130	200
1.5	DIGITAL ELECTRONICS	04	04	2.5	50	20	70	03	60	40	100	170
1.6	STUDENT CENTER ACTIVITIES*	-	2	-	-	-	-	-	-	-	-	-
TOTAL		22	26	-	200	80	280	-	360	200	560	840
Games/NCC/Social and Cultural Activity + Discipline (15 + 10)												25
TOTAL												865

### 2<sup>nd</sup> Semester

S.No	SUBJECT	PERIOD PER WEEK		EXAMINATION SCHEME								GRAND TOTAL
		THEORY	PRAC	THEORY				PRACTICAL				
				EXAMINATION		SESS MARKS	TOTAL MARKS	EXAMINATION		SESS MARKS	TOTAL MARKS	
				DUR	MARKS			DUR	MARKS			
2.1	DATA COMMUNICATION & COMPUTER NETWORK	06	04	2.5	50	20	70	03	60	30	90	160
2.2	MICROPROCESSOR	06	06	2.5	50	20	70	3	60	40	100	170
2.3	NETWORK ADMINISTRATION & SECURITY	06	04	2.5	50	20	70	03	60	30	90	160
2.4	PROJECT	--	08	--	--	--	--	VIVA	70	30	100	180
	FIELD EXPOSURE	--	--	--	--	--	--		50	30	80	
2.5	STUDENT CENTER ACTIVITIES*	--	2									
TOTAL		18	24		150	60	210	-	300	160	460	670
Games/NCC/Social and Cultural Activity + Discipline (15 + 10)												25
TOTAL												695
GRAND TOTAL(I Semester +II Semester)												1560

Note: 1.Each period will be of 50 minutes duration.

2.Each session will be of 16 weeks.

3.Effective teaching will be at least 14 weeks.

4.Remaining periods will be utilized for revision etc..

5. 2 Weeks structured & supervised branch specific task oriented industrial/field exposure to be organized at the end of session.. The students will submit a report. This will be evaluated at institution level for 30 marks & 50 by Project examiner for viva and report presented by the student.

## 1.1PC MAINTENANCE AND TROUBLESHOOTING

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### Practical's Related Theory

#### Unit I

Input & Output Devices, their types and specifications, CPU, Memory devices- types primary and secondary.

#### Unit II

Study of Motherboard RAM, ROM, CMOS, POST, BUS, (Address, Data, SYSTEM) Connections of various devices such as Display Adapter, Ports ( Serial, Parallel, USB)& Modem on the Mother Board. Importance of CPU cooling, Motherboard troubleshooting.

#### Unit III

Key Board: Switches, Keyboard organization, Key board type, Wireless Keyboard Trouble shooting. Mouse: Mouse type- Scroll & Optical Mouse, Function Connecting Mouse, Trouble shooting Mouse.

Ports Modems

#### Unit IV

HDD types, integrated, SCSI, Magnetic recording, Formatting ( Track, Sector) Cluster, Defragmentations , Bad Sector, Jumper Setting, Common Problem and its trouble Shooting, External Drive ( HDD), Optical Drives. FDD types and working and its related problem. CD and DVD drives- ROM and Writer, COMBO drives, , Mass Storage Devices. USB Devices:-Hub, Pen Drives

#### Unit V

Printers: Working of LED, DMP, Ink Jet, Laser Printer, line printer, MFP ( Multi Functional Printer and its Trouble shooting. Scanners- Working method and its trouble shooting. Plotters

#### Unit VI

System Software, Application Software driver Software Installation, Windows and other S/w & Anti Virus

#### Unit VII

BOOT PROCESS : Setting of CMOS, Setup

### **Unit VIII**

SMPS POWER SUPPLY : Operating characteristics, Types and maintenance.

### **Unit IX**

TYPES OF PC'S : Desktop. Laptop. Palmtop. BIOS/ CMOS setting.

### **Unit X**

PC TOOLS

#### **List of Practicals**

- 1 To recognize various parts of a typical computer system.
- 2 Assembly and disassembly of a system box and identifying various parts inside the system box.
- 3 Assembly and disassembly of key board and mouse and study of their interface cables,
- 4 connectors and ports and handling keyboard/mouse parameters in windows
- 5 Installing and using various wireless input devices(Keyboard/Mouse/Scanner etc.) under Windows/Linux.
- 6 Study of installing a scanner and using it. Using mic and speaker to input and output sound using Windows/Linux.
- 7 Assembly and disassembly of printer, installing a printer, taking test page, and using printer under Windows/Linux.
- 8 Study of various types of memory chips and using them.
- 9 Study of various types of hard disk drives and preparing them for use
- 10 Writing CD and DVD using Windows/Linux.
- 11 To install and remove microprocessor to and from the motherboard.
- 12 To install and remove SMPS and to troubleshoot it.

#### **Books:**

1. Upgrading & Repairing PCs : Muller – Prentice Hall – 10th Edition, 2000.
2. Complete PC Upgrade & Maintenance Guide : Mark Minasi–BPB Publishers–15th Edition, 2004.

3. PC Hardware: The Complete Reference by Craig Zacker and John Rourke, TMH Publication
4. Modern Computer Hardware Course by M Lotia, P Nair and P Lotia, BPB Publication
5. The Principles of Computer Hardware by Alan Clements, Oxford University Press, 2000.

## **1.2 Windows and Linux Networking**

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### **RATIONALE**

Window and Linux Networking Course is intended to provide practical exposure and knowledge about various networking concepts/troubleshooting techniques required in working with windows Operating System as well as Linux Operating System.

### **Detailed Contents**

#### **Unit I - Windows Networking**

Fundamentals of Computer Networking in Windows System, OSI Model, Network hardware, Interconnecting of network hardware, Workgroup and Domain Networks

#### **Unit II - Windows Networking**

Preparing network cables, Dynamic and Static IP addressing, Client – Server network, Basic Administration, Installing Client and Server OS, Implementing Domain Network using Active Directory, Installation of server roles: file server, application server, DHCP server and DNS server, Remote Management.

#### **Unit III - Linux Networking**

Configuring Basic Linux Networking, Managing Linux Server, Remote management using telnet, ssh, DHCP server, Apache web server

#### **Unit IV- Linux Networking**

Bind DNS server, Troubleshooting Linux Network, The Network File System (NFS), Samba Server, Configuring Internet in Linux Systems.

### **List of Practical:**

1. Perform Linux Installation
2. Creating Users, Groups and Examining Permissions
3. Perform Dual Boot Installation
4. Learning Linux File System Management
5. System Monitoring - Server - Client setup
6. Configuring NFS Server & Client
7. Installing & Configuring Samba Server
8. Perform File & Printer sharing

9. Configuring Apache Web Server
10. Perform Name based Virtual Hosting
11. Implementing Restriction through htaccess
12. Configuring Mail Server, SMTP Server, POP3 / IMAP Server
13. Setup and configuring - Static Routing

**Books/references:**

1. Windows Networking Basics, By Kenneth Gregg, published by IDG Books Worldwide
2. Microsoft Windows Networking Essentials by Darril Gibson

## 1.3 VIRTUALIZATION AND CLOUD COMPUTING

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### Theory

#### Unit I Introduction

Introduction, Roots of Cloud Computing: From mainframe to Cloud, Benefits of Cloud Computing SOA, Web services, Web 2.0, Mashups, Grid computing, Utility computing, Hardware virtualization, Essentials of Cloud characteristics, Challenges, Cloud economics, Role of Networks in Cloud Computing: Cloud types and service models, Cloud computing platforms : Openstack, Opennimbus, Eucalyptus Primary Cloud Service models, Cloud Services brokerage, Primary cloud deployment models, cloud computing reference model, The Greenfield and Brownfield deployment options

#### Unit II Virtualization

Introduction, Characteristics of Virtualized environments, Taxonomy of Virtualization techniques, Pros and Cons of Virtualization, Technology examples: Xen, KVM, VMware, Microsoft Hyper-V

#### Unit III Storage in Cloud

Storage system architecture, Big data, Virtualized data centre (VDC) architecture, VDC Environment, server, storage, networking, desktop and application virtualization techniques and benefits, Virtual Machine Components and Process of converting physical to VMs, Block and file level storage virtualization, Virtual Provisioning, and automated storage tiering, VLAN, VSAN and benefits, Network traffic management techniques in VDC, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Features and comparisons among GFS,HDFS.

#### Unit IV Cloud computing platforms

Infrastructure as Service, best-of breed cloud infrastructure components, cloud ready converged infrastructure, Virtual machine provisioning and migration services, Anatomy of Cloud infrastructure, Distributed management of virtual infrastructure, scheduling techniques, SLA Commitment

#### Unit V Cloud monitoring and management

Introduction and architecture for federated cloud computing, Performance prediction for HPC on Cloud. SLA management: Types of SLA, Life cycle of SLA, Traditional approaches of SLA. service catalog, service ordering process, management and functional interfaces of services , cloud portal and its functions, cloud interface standards along with SOAP and REST, system integration and work-flow modeling, cloud service life-cycle phases: service planning, service creation, service operation, and service termination Control layer, its functions and benefits, element and unified manager, software defined approach and techniques for managing IT resources 45

## **Unit VI Security in Cloud Computing**

Introduction, Global Risk and Compliance aspects in cloud environments and key security terminologies, Technologies for Data security, Data security risk, Cloud computing and identity, Digital identity and access management, Content level security, Security-As-A-Cloud Service

### **List OfPracticals**

- i) Software study - HadoopMapReduce& HDFS
- ii) Service deployment & Usage over cloud.
- iii) Managing Cloud Computing Resources
- iv) Using existing cloud characteristics & Service models
- v) Security Management
- vi) Performance evaluation of services over cloud

### **Books:**

1. Cloud Computing by M N Rao, PHI Publication, 1<sup>st</sup> edition.
2. Cloud Computing by Saurabh Kumar, Wiley Publication
3. Cloud Computing Bible, Wiley Publication
4. Mastering Cloud Computing by R Buyya, C. Vecchiola and S. T. Selvi, TMH Publication
5. Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, The Prentice Hall Service Technology Series
6. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012



## 1.4 ROUTING AND SWITCHING

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### Theory

#### **Unit I: Operation of IP Data Networks**

Operation of IP Data Networks, Recognize the purpose and functions of various network devices such as Routers, Switches, Bridges and Hubs, Select the components required to meet a given network specification. Identify common applications and their impact on the network, Describe the purpose and basic operation of the protocols in the OSI and TCP/IP models. Predict the data flow between two hosts across a network. Identify the appropriate media, cables, ports, and connectors to connect network devices to other network devices and hosts in a LAN

#### **Unit II: LAN Switching Technologies**

Determine the technology and media access control method for Ethernet networks, Identify basic switching concepts and the operation of Cisco switches. Configure and verify initial switch configuration including remote access management. Verify network status and switch operation using basic utilities such as ping, telnet and SSH. Identify enhanced switching technologies Describe how VLANs create logically separate networks and the need for routing between them. Configure and verify VLANs, Configure and verify trunking on Cisco switches, Configure and verify PVSTP operation

#### **Unit III: IP addressing (IPv4 / IPv6)**

Describe the operation and necessity of using private and public IP addresses for IPv4 Addressing, Identify the appropriate IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment. Identify the appropriate IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment. Describe the technological requirements for running IPv6 in conjunction with IPv4 such as dual stack, Describe IPv6 addresses

#### **Unit IV: IP Routing Technologies**

Describe basic routing concepts, Describe the boot process of Cisco IOS routers, Configure and verify utilizing the CLI to set basic Router configuration, Configure and verify operation status of a device interface, both serial and Ethernet, Verify router configuration and network connectivity, Configure and verify routing configuration for a static or default route given specific routing, requirements, Manage Cisco IOS Files, Differentiate methods of routing and routing protocols, Configure and verify OSPF (single area), Configure and verify EIGRP (single AS), Configure and verify interVLAN routing (Router on a stick), Configure SVI interfaces

### **Unit V: IP Services**

Configure and verify DHCP (IOS Router), Describe the types, features, and applications of ACLs, Configure and verify ACLs in a network environment, Identify the basic operation of NAT, Configure and verify NAT for given network requirements, Configure and verify NTP as a client, Recognize High availability (FHRP), Configure and verify Syslog, Describe SNMP v2 & v3

### **Unit VI: Network Device Security**

Configure and verify network device security features, Configure and verify Switch Port Security features, Configure and verify ACLs to filter network traffic, Configure and verify an ACLs to limit telnet and SSH access to the router

#### **Practical Exercises**

1. Identifying Router components and accessories.
2. Identifying router and switch IOS software.
3. Installing graphical network simulator V3.
4. Configuring IOS web server authentication.
5. Configuring static routing.
6. Configuring RIP Versions 1 and 2.
7. Configuring basic EIGRP.
8. Configuring basic OSPF.
9. Configuring Internet Protocol Versions Ipv4 and Ipv6.
10. Configuring basic password authentication.

#### **Books:**

1. CCNA Routing and Switching Guide by Todd Lammle, Sybex Publication
2. CCNA Routing and Switching 200-120 by Wendell Odom, Cisco Press
3. Troubleshooting IP Routing Protocols (CCIE Professional Development Series) By Zaheer Aziz, Johnson Liu, Abe Martey, FarazShamim, Cisco Press

4. Routing TCP/IP, Volume II (CCIE Professional Development) By Jeff Doyle, Jennifer DeHaven Carroll, Cisco Press
5. Routing TCP/IP, Volume 1, 2nd Edition By Jeff Doyle, Jennifer Carroll, Cisco Press

## **1.5 DIGITAL ELECTRONICS**

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### **SECTION-I**

#### **1. INTRODUCTION TO DIGITAL ELECTRONICS;**

- 1.1 Basic difference between analog and digital Signal.
- 1.2 Application and advantages of digital signal processing.

#### **2. NUMBER SYSTEM;**

- 2.1 Binary, Octal and Hexadecimal number system; conversion From decimal octal and hexadecimal to binary and vice-versa.
- 2.2 Binary addition, subtraction, multiplication and division including binary numbers
- 2.3 1's and 2's complements method subtraction.

#### **3. CODES, CODE CONVERSION AND PARITY**

- 3.1 The 8421 and excess-3 codes; mention of other popular BCD Codes
- 3.2 Addition of 8421, BCD coded numbers its limitations and Excess-3 coded numbers.
- 3.3 Gray code. Gray to binary conversion and vice-versa
- 3.4 Basic concept of parity. Single and double parity and error detection

#### **4. LOGIC GATES;**

- 4.1 Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates.
- 4.2 Concept of negative and positive logic.

#### **5. LOGIC SIMPLIFICATIONS**

- 5.1 Boolean Algebra, Karnaugh Mapping and simple application in developing combinational logic circuits
- 5.2 Implementation of logic equation with gates
- 5.3 Use of NAND and NOR gates as universal gates

#### **6. LOGIC FAMILIES AND DIGITAL ICs;**

Logic family classification:

- 6.1 Definition of SSI, MSI, LSI, VLSI.

6.2 Bipolar Logic, Diode Logic, Transistor Inverter. TTL logic. CMOS logic. ECL Logic

6.3 Sub-classification of TTL and MOS logic families.

6.4 Characteristics of TTL and MOS Digital gates delay, speed of noise margin, logic levels, power dissipation. Fan-in. Fan-out, power supply requirements and comparison between TTL and MOS ICs.

6.5 Logic Circuits

Open collector and totem pole output circuit operation for standard TTL, NAND Gate MOS circuit operation for a standard gate (NOR).

6.6 Familiarization with commercial digital IC gates. Their number identification and Pin configuration

## **7. ARITHMETIC OPERATIONS**

7.1 Design of Exclusive Or. Half adder and half subtractor

7.2 Design of Full adder circuits and its operation.

7.3 Design of Full subtractor circuits and its operation.

7.4 Some Examples of Code Converters

## **8. ENCODER, DECODERS & DISPLAY DEVICES ASSOCIATED CIRCUITS;**

8.1 LED. LCD. seven segment display. Basic operation of various commonly used types.

8.2 Four Decoder circuits -for 7 segment display.

8.3 Basic decimal to BCD encoder circuits.

8.4 Use Or decoders/driver ICs with reference to commercial ICs.

8.5 Basic Multiplexer and Demultiplexer

## **9. FLIP FLOPS**

1. Brief idea of Flip-Flops and their operations

RS, T, RST, D, JK. Master/Slave JK Flip Flop mention commonly used ICs Flip flops.

## **10. Counters**

10.1 Counters classification.

10.2 Binary and decade counters.

10.3 Divide by N-counters

10.4 Programmable asynchronous counters

10.5 Down counters up/down counter operations

10.6 Pre settable asynchronous counters

10.7 Difference between asynchronous and synchronous counters

10.8 Ring counter with timing diagram

10.9 Familiarization with commercial TTL/CMOS counters ICs.

## **11. SHIFT REGISTERS;**

11.1 Introduction and Basic concepts including shift left and shift right.

11.2 Serial In Serial Out

Serial In Parallel Out

Parallel In Serial Out

Parallel In Parallel Out

11.3 Universal shift register.

11.4 Familiarization with common TTL/CMOS ICs.

11.5 Buffer register, Tristate Buffer Register.

## **12. MEMORIES**

12.1 Classification according to the following heads.

(a) Volatile and non-volatile memories.

(b) Random access memories and sequential access.

(c) Semiconductor and non-semiconductor memories.

(d) Destructive and non-destructive memories.

12.2 Semi-conductor ROMs, PROMs, EPROM, SRAM. DRAM, structure and working of CCD.R/W memory.

## **13. A/D AND D/A CONVERTERS:**

13.1 Use of A/D and D/A converters.

13.2 Binary resistor network R-2R network

13.3 D/A converter using R-2R

13.4 UP, UP/Down counter type A/D converter

13.5 Successive Approximation

13.6 Basic concepts of parallel A/D converter

13.7 Two bit A/D converter

## **14. ARITHMATIC CIRCUITS**

14.1 Basic arithmetic logic units application

14.2 Block diagram explanation of binary multiplier circuits

### **List of practicals**

1. Do atleast 10 experience familiarization with bread-board.

Familiarization with TTL and MOS IC's

2. Identification of IC- nos, Pin- nos, IC types

3. To observe that logic Low and logic High do not have same voltage value in Input Output of logic gate.

4. To observe the propagation delay of TTL logic gate.

5. Observation of the difference between MOS and TTL gates under the following heads.

1) Logic Levels.

2) Operating Voltages.

3) Propagation delay

Display Devices and Associated Circuits.

6. Familiarization and use different types of LEDs common anode and common cathode seven segment display.

7. Use of 7447 BCD to 7-segment decoder.

Logic Gates

8. Verification of truth table for 2 input NOT, AND, OR, NAND, NOR, XOR Gates.

Design and Implementation of Simple Logic Circuits

9. To construct a 4-bit even/odd parity generator/checker using XOR gates and to verify their truth tables.

10. To construct half adder and half subtractor using XOR and NAND gates verification of their truth tables.

11. To construct a full adder circuit with XOR and NAND gates.

12. (a) Study of 3 bit adder circuit implemented with or and NAND gates.

(b) To construct 4 bit adder and full subtractor using full adder chip 7480 and NAND gates.

13. (a) To verify the truth table of 4 bit adder IC chip 7483.

(b) To construct the 4 bit adder/2's complement subtractor using 7483 and NAND gates NAND gates.

Flip Flops

14. To verify the truth table for selected positive edge triggered and negative edge triggered F/F of J-K and D type.

Counters

15. To construct and verify truth table for asynchronous binary and decade using J-K flip flops.

16. (a) To construct device by 60 counter using ripple.

(b) To use counter IC chip 7493 in the divide by eight mode and divide by sixteen mode.

(c) To construct a divide by 100 counter using CMOS.

17. To construct a divide by 60 counters using synchronous counter IC chips.

Registers

18. To construct a 4 bit buffer register using 4 bit register IC chip.

19. To construct a 4 bit universal shift register using flip flops.
20. To use a 4035 B universal shift register.

Multiplexers and Demultiplexers.

21. To decode a 3 line to 8 line encode from 8 line to 3 line and to observe input and outputs.
22. Single plus to 16 line decoder and observation output after a 16 to 4 line encoder.
23. To use ALU chip for selected arithmetic and logic operations.

## IIInd Semester

### **2.1 DATA COMMUNICATION & NETWORKS**

L T P  
6 - 4

#### **RATIONALE**

The future of computer technology is in data communication and networks. Global connectivity can be achieved through computer networks. A diploma holder in computer engineering should therefore understand the function of networks. Knowledge about hardware and software requirements of networks is essential.

#### **DETAILED CONTENTS**

##### **1. Concept of Communication**

Communication concept and type, need of modulation, types, difference of AM/ FM and FM/PM, PAM and PCM, Transmission of Digital Data, Transmission media and medium modes, data transfer, rate of data transfer, Data packets, data encryption and decryption concept and type of Modems: Transmission rate, modem standards, Error Detection and correction techniques(CRC,VRC)

##### **2. Network**

Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

##### **3. Medium Access sub layer:**

Channel Allocations, LAN protocols- ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

#### 4. **Network Layer**

Network Layer, Point - to Point Networks, routing, Congestion Control Internetworking - TCP / IP, IP packet, IP address, IPv6.

#### 5. **Transport Layer**

Transport Layer - Design issues, connection management session Layer-Design issues, remote procedure call., Presentation Layer, Design issues, Data compression techniques, cryptography, TCP , Window Management.

#### 6. **Application Layer**

Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

### **LIST OF RECOMMENDED BOOKS**

1. Computer Networks by Tanenbaum; Prentice Hall of India, New Delhi
2. Data Communications and Networking by Forouzan, (Edition 2<sup>nd</sup> and 4<sup>th</sup> ); Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Data and Computer Communication by William Stallings; Pearson Education, New Delhi
4. Networking Essentials; BPB Publications New Delhi
5. Computer Network and Communications by V.K. Jain and Narija Bajaj; Cyber Tech Publications, New Delhi.
6. Linux – The Complete Reference by Richard Peterson; Tata McGraw Hill Education Pvt Ltd, New Delhi.
7. Linux – Install and Configuration Black Book by Dee Annleblanc and Issac Yates; IDG Books India Private Limited, Delhi.



8. Unleashed Linux; TechMedia Publishers, New Delhi
9. Computer Network by J.S. Katre; Tech-Max Publication, Pune

## 2.2 Microprocessor

L T P

6 - 6

### 1. Overview of Microprocessor System:

#### 1.1 Functional block.

(a) CPU

(b) Memory

(c ) Input/output devices ( Key Board, Floppy Drive, Hard Disk, Tape Drive, VDU, Printer, Flotter)

#### 1.2 Concept of programme and data memory

(a) Registers( general purpose)

(b) external memory for storing data and results

#### 1.3 Data transfer between registers.

#### 1.4 Concept of tristate bus

#### 1.5 Control on registers.

### 2. Memory of a Microprocessor

#### 2.1 Concept of byte organized memory

(a) Address inputs.

(b) Address space

(c ) Data input/output

#### 2.2 Addressing and Address decoding

(a) Memory system organization

(b) Partitioning of total memory space into small blocks.

(c) Bus contention and how to avoid it.

### 2.3 Memory Chips

(a) Types of ROM, RAM, EPROM, PROM

(b) Read/Write inputs.

(c) Chip enable /select input

(d) other control input/output

- Address latching

- Read Output

- Address Strokes

(e) Power supply inputs.

### 2.4 Extension of memory

- In terms of word length and depth

## 3. C P U & CONTROL

3 General Microprocessor architecture.

3.1 Instruction pointer and instruction register

3.2 Instruction format

- Machine and Mnemonics codes.

- Machine and Assembly language

3.3 Instruction decoder and control action

3.4 Use of Arithmetic Logic unit

- Accumulator .

- Temporary Register

- Flag flip-flop to indicate overflow, underflow, zero result occurrence

3.5 Timing and control circuit

- Crystal and frequency range for CPU operation

- Control bus to control peripherals.

## 4. Introduction of 8085 Microprocessor

Evolution of Microprocessor , Register Structure , ALU, BUS organization , Timing and Control.

## 5. Introduction of 8086 Microprocessor

Internal organization of 8086, Bus interface unit, Execution unit, unit , register, organization, sequential memory organization, Bus cycle.

## 6. Assembly Language Programming

Addressing Modes, Data Transfer, Instruction, Arithmetic and Logic Instruction, Programme control instruction ( Jumps, conditional Jumps, Subroutine Call) Loop and string instruction, assembly directives.

7. Programmes I/O, Interrupt Driven I/O, DMA, parallel I/O ( 8255 –PPI, centronics parallel port), serial I/O ( 8251/8250, RS- 232 standard) , 8259-Programmable Interrupt controller, 8237- DMA controller, 8253/8254- Programmable Timer/Counter, A/D and D/A conversion.

8. Memory Interfacing:

Types of Memory, RAM and ROM interfacing with Timing consideration, DRAM interfacing.

9. Advance Microprocessor and Micro Controllers :  
Pentium and Power PC

### **List of Practical's**

1. Assembly language programming :- Programming of simple problems.
2. Simple programming problems using 8085 and 8086 microprocessor.  
Trainer kit to gain competence in the use of
  - (a) 8085 and 8086 Instruction set.
  - (b) Support chips of 8085 and 8086.

## **2.3 NETWORK ADMINISTRATION & SECURITY**

**L T P**

**6 - 4**

1. Introduction to Windows server, Professional and Windows 2003 server, Installation & configuration of Windows server professional, Installation & configuration of Windows server.
2. User & Group Managements, NTFS & share permissions. Using device manager, Drivers signing & signature verification. Managing Ports, Installing & Managing & configuring printers. Disk Management Tools & Tasks, File Systems, User Management. Installing Active Directory.
3. Domain user account, configuring user account properties. Domain groups. Viewing a user's effective permission. Creating and managing shares. Implementing files and folder NTFS & share permission, Special permission, inheritance. Implementing Shadow copies. Implementing and Managing the Distributed File system( DFS). Auditing Access to Resources.

4. Installing and Configuring Terminal Services. Managing servers remotely using terminal services ( Remote desktop). Backup restoring data.
5. Installing DNS. Implementing DNS in windowsnetworks.
6. Installing and configuring DHCP. Monitoring and Managing Internet information services ( IIS 6.0) Remote Access server. Configuring & Implementing VPN. Configuring & Implementing Remote Access services.
7. Configuring &Implementing routing services. Configuring & implementing ICS. Active directory services. Implementing active directory services forest.
8. Planning implementing an OU structure. Implementing server roles. Restoring active directory.
9. Local and domain security policies. Working with group policy

## **NETWORK SECURITY**

1. Introduction  
Need for securing a network; Principles of Security, Type of attacks, introduction to cyber crime, cyber law-Indian Perspective (IT Act 2000 and amended 2008), cyber ethics, ethical hacking. What is hacking? attacker, phreaker .
2. Securing Data over Internet  
Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures, Digital certification, IPSec
3. Virus, Worms and Trojans  
Definitions, preventive measures – access control, checksum verification, process configuration, virus scanners, heuristic scanners, application level virus scanners, deploying virus protection.
4. Firewalls  
Definition and types of firewalls, firewall configuration, Limitations of firewall.
5. Intrusion Detection System (IDS)  
Introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up

6. Handling Cyber Assets- Configuration policy as per standards, Disposable policy
7. Virtual Private Network (VPN)  
Basics, setting of VPN, VPN diagram, configuration of required objects, exchanging keys, modifying security policy
8. Disaster and Recovery  
Disaster categories; network disasters – cabling, topology, single point of failure, save configuration files; server disasters – UPS, RAID, Clustering, Backups, server recovery

### **List OfPracticals**

1. Installation & configuration of Windows professional.
2. Installation & configuration of Windows server.
3. Installing and Configuring Terminal Services
4. Installing DNS. Implementing DNS in windows networks.
5. Installing and configuring DHCP.
6. Configuring & Implementing routing services
7. Configuration and setup of adhoc network and infrastructure network.
- 8 NET tools, Deployment of NETTOOLS.
9. Tracing of email origin using email trace pro utility.
10. Use of keylogges and anti key logger to secure your system.

## 2.4 PROJECT

<b>L</b>	<b>T</b>	<b>P</b>
-	-	<b>8</b>

### GENERAL OBJECTIVE:

Purpose of the project work is :

( i ) To develop abilities of diagnosing problems.

( ii) To develop the abilities to :

(a) Make literature survey.

(b) Design/develop/fabricate/test simple circuits.

(c) Prepare documents for electronic work.

(d) Work as a team.

### 1. COMPUTER SCIENCE PROJECT (SW/HW):

The student is expected to work on a project in consultation and acceptance with the instructor on either system software or hardware aspects related to industrial

environment. The student is also expected to fabricate different cards used in PC, their testing and assembly of PC.

The end targets for the project should be well defined and evaluation should place major importance on meeting these targets.

## 2. NETWORKING PROJECT

The student is expected to work and learn from implementing an application software and study its functional and performance aspects and submit a report.

**The evaluation must be based on the project report and the seminars.**

### **Field Exposure:**

2 Weeks structured & supervised branch specific task oriented industrial/field exposure to be organized at the end of session.. The students will submit a report. This will beevaluated at institution level for 30 marks &50 by Project examiner for viva and report presented by the student.

### **Student Center Activities**

**(\*Non-credit subject)**

The purpose of this subject is to enhance the skills of students in following areas:

1. English proficiency
2. Level of academic knowledge
3. Presentation skills

To achieve above goals,small group of students or individual students with similar needs work independently.





5.	Computer Programmer	1
6.	Steno Typist	1
7.	Accountant / Cashier	1
8.	Student / Library Clerk	1
9.	Store Keeper	1
10.	Class IV	6
11.	Sweeper	Part time as per requirement
12.	Chaukidar&Mali	As per justification

Note :

1. Services of other discipline staff of the Institute may be utilized if possible
2. Qualifications of Staff : as per service rule

## SPACE REQUIREMENT

### [A] ADMINISTRATIVE BLOCK

Sl. No.	Details of Space	Floor Area Sq. metres
1.	Principal's Room	30
2.	Confidential Room	10
3.	Steno's Room	6
4.(a)	Office including Drawing Office	80
(b)	Record Room	20
5.	Staff Room	
	(a) Head 1	15
	(b) Lecturer 10 sq.m./ Lect.	

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for 4 Lecturers	40
6. Library and Reading room	150
7. Store	100
8. Students Common room	80
9. Model Room	90
10. LRDC In Academic Block	100
11. Seminar Room (One)	75

#### [B] ACADEMIC BLOCK

Sl.No.	Detail of Space Sq.m.	Floor Area
1.	Class Room -One	60
2.	Electronic Laboratory-One	120
3.	Digital Electronics & Microprocessor Lab-One	120
4.	Electronics Workshop & EIM Lab-One	120
5.	Computer H/w & Project Lab-One	120
6.	Computer Centre (Air Cond. Glass Partition and Special type pvc flooring and false ceiling ), Two Computer Centers For Space of 60 Sq. m	120

#### [D] STUDENT'S AMINITIES

1. Hostel	40 % of Strength of Students
2. Cycle Stand	50 % of Strength of Students
3. Canteen and Tuck shop	50 Sq.m
4. N.C.C. Room	70 Sq.m
5. Dispensary	40 Sq.m
6. Guest Room(Attached Bath) incuding kitchen & store	45 Sq.m

#### [E] STAFF RESIDENCES

Sq.m		
1.	Principal	100
2.	Head of the Department	100
3.	Lecturer	320
4.	Non teaching & Supporting	480

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staff

5. Class IV 6 180

Priority to be given in following order

(1)

- a. Administrative Building
- b. Labs
- c. Over head Tank
- d. Boundary Wall
- e. Principal Residence
- f. Forth Class Quarters (2/3)

(2)

- a. Hostel
- b. Students Aminities

(3)

Residences of employee

#### COMPUTER CENTRE

S.No.	DESCRIPTION	QTY.	APPROX. COST
			(in Rs.)
1.	Core-2 Quad Processor,4GB RAM, 1 GB SATA HDD, 19" TFT MONITOR,WLAN, OS-Windows 2007/2008/Latest Version	02 Server	1,20,000

2- General Desktop Computer-Intel i5 60 Node 36,00,000  
 or Higher, 2GB RAM,320 GB SATA HDD,  
 17" TFT/ LCD/LED Monitor,  
 DVD Writer, Multi Media Kit with  
 Speaker & Microphone  
 Key Board - Multimedia  
 Mouse - Optical Scrool or Latest  
 32 Bit PCI ETHERNET CARD(10/100) Mbps  
 Internal Modem, Pen Drive 16GB  
 Pre loaded Windows 2007/2008/Latest  
 Pre loaded latest Anti Virus with Life time  
 Subscription,licence media and manual  
 with UPS 660 VA

OR

Computer of latest Specification

3. Lap Top (Latest Version) 04 Rs 250000  
 With damage warrantly & 3 hrs.backup battery

4. Software :(WithLicence) LS

i. ORACLE 11i/My SQL 5.5 or Latest Windows based  
 30 USERS) & Development (Latest)

ii. VISUAL STUDIO (professional 2012)

iii. MS OFFICE 2010

iv. COMPILER -'C',C++, JAVA-7

v. Unix & Linux -Red Hat/UBUNTU/Fedora orlatest  
 withlicence for 30 users

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- vi. Page Maker, Corel Draw( full package),Adobe Reader,  
Adobe Dream WeaverCS6,FlashPhotoshop,Net Beams  
Personal Web Server,HTML,IIS.
- vii. Tally.ERP9

3. Hardware Rs. 5,00,000. (LS)

- i. Switch-32 Port 02
  - ii. Router 02
  - iii. Hub 04(08 Port)
  - iv. Ext.Modem 02
  - v. Wireless N/W Adaptor 02
  - vi. Series Access Point 02
  - vii. LAN cable meter 05
  - viii. LAN cable analyzer 05
  - ix. LAN trainer board 05
  - x. DATA communication trainer board 05
  - xi. Crimping Tool 15
- And all other accessories related to Networking.

4. Scanner- Flat Bed A4/Auto lighter 02 Rs 20000.00  
(bit depth 48)

5. 132 Column 600 CPS or faster 02 Rs 50000.00  
9 Pin dot matrix printer with  
500 million character head life

6. Laser Jet-A4,All In One 20 page per min(2 Each) 04 Rs. 10000.00

7. Desk Jet-A4, Photo Smart(2 Each) 04 Rs 40000.00

8. 5 KVA on line UPS with minimum 04 Rs 800000.00

30 minute battery backup along  
with sealed maintenance free  
batteries. Provision for connecting  
external batteries with network  
connectivity. (For 2 Labs)

9. Split Air Conditioner 1.5 tones 08 Rs. 350000.00  
capctity with ISI mark alongwith

electronic voltage stablizer with  
over voltage and time delay circuit

10. Room preparation and furniture	LS	
11. 19" rack, 24-port switch, connector RJ-45 Cat-6 cabling for network	LS	Rs 100000.00
12. 2 KVA Inverter Cum UPS	02	Rs 60000.00
13. Digital Camera latest version	01	Rs 20000.00
14. Fire Extinguisher (2 Kg.)	04	Rs 15000.00
15. Fire Extinguisher (5 Kg.)	04	Rs 25000.00
16. Vaccum Cleaner	02	Rs 25000.00
17. LCD Projector 3000 lumen with all accessories	02	Rs 350000.00
18. Pen drive 16 GB	10	Rs 10000.00
19. DVD writer External	02	Rs 10000.00
20. HDD External 500 GB	02	Rs 15000.00
21. PDA (Latest Configuration)	02	Rs 15000.00
22. Broadband For Internet(Speed Min. 8mbps)	04	LS
23. USB Modem	02	Rs 8000
24. Generator 15 KVA Water Coolent	01	Rs. 450000.00

NOTE : All the above items should be equally distributed in the 2  
computercentres

HARDWARE MAINTENANCE & PROJECT LAB

S.No.	Descirption	Qty.	Approximate Cost.
1	Digital Multimeter 3 ½ to 4 ½ digit, 1000volt D.C.2 mega ohm range, Resistance, capacitance, freq., diode, transistor, continuity testing, AC/DC change	15	Rs. 55,000.00
2	Power Supply Regulated/transistorized 0-30 volt	15	Rs. 50,000.00
3	Intel i5 or higher Processor 2 GB RAM, 320 GB HDD,	15	Rs. 10,00,000.00

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	or Higher, CD/DVD Drive		
4	Printer (600 cps) a) Dot Matrix b) Desk Jet c) Laser	03 each	Rs. 2,00,000.00
5	Constant Voltage Transformer	5	Rs. 50,000.00
6	PC Card Sets (One Mother Board, 4 Cards)	5	Rs. 50,000.00
7	Spike Booster, LAN Tester	15	Rs. 20,000.00
8	Trainer Board i-To demonstrate assembly & working of multimedia computer system ii- To study mother board with different chip set and processor iii-To study Hard Disk ( SATA/IDE) iv-To Study construction & working of TFT/LCD/LED monitor v- To study dot-matrix, Ink Jet, Laser Jet printer	05 set of each board	Rs. 5,00,000.00

9	Tool Kit	15	Rs. 75,000.00
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ELECTRONICS LABORATORY

1Basic Electronic Lab.

S.No.	Name of the Equipment/ Board/Kit Etc.  Lab.	Elex. Components & & Devices .		Rate per Piece	Total Cost		
					In Rs.	Intake	
		30	60			30	60
1.	Auto Oscillator	2	4	2000	4000	8000	
2.	Multimeter, 20 K. Ohm per volt Sensitivity, q1% accuracy d.c voltage 2500 v. max.	2	4	1000	2000	4000	
3.	Digital Elex. multimeter.	7	12	3000	2100	36000	
4.	Regulated Power Supply 0-30 V, 0.5/1 Amps.	5	10	2000	10000	20000	
5.	Dual Power Supply 0-30 V, 1Amps	2	4	2500	5000	10000	
6.	Power Supply 0-300 Volt	-	-				
7.	C.R.O. (0-10 MHz)	2	4	10000	20000	40000	
8.	Dual Trace C.R.O. (0-10 MHz)	1	3	15000	15000	45000	
9.	R.F.Signal Generator	-	-				
10.	Function Generator	-	-				
11.	A.C. Millivolt Meter (Elex.)	-	-				
12.	Out Put Audio Power Meter 215 K - 20 K & 1 MW - 10 MW	-	-				
13.	A.C. Milliammeter/A.C. Micro- meter & A.C. Millivoltmeter (Suitable range)	4	8	500	800	4000	
14.	D.C. Voltmeter /D.C. Milliamme- ter/D.C. Micrometer (suitable range)	20	40	500	4000	20000	
15.	Decade Resistance Box (Different ranges)	-	-				
16.	Decade Capacitor Box (Different range)	-	-				
17.	Decade Inductance Box	-	-				

18.	Different Transducers : pressure type, thermo couple, LVFT, Opto pick electromagnetic pick up; Thermal relay, ultra- sonic pick up and potentiometer etc. including strain gauge	-	-			
19.	Experimental Kit/ Teaching Modules/ Training boards/ Learning kits. of relevant subject.	30	60		--	
20.	Component Storage rack	2	4		--	
21.	Consumable Items	LSLS			--	
22.	Miscellaneous	LSLS			--	



Fundamentals of Digital Electronics & Microprocessor Lab

S.No.	Name of the Equipment/ Board/Kit Etc.	Principles of Digital		Micropro- cessors&		Total		Total No.		Rate per Piece	Total Cost	
		Eltx. Lab.	Applicat- ion Lab.					Recommen- ded			@ Rs.	Intake
		Intake 30	Intake 60	Intake 30	Intake 60	Intake 30	Intake 60	Intake 30	Intake 60		Intake 30	Intake 45
1.	CRO dual trace with delayed time base, 25 MHz or higher band width.	1	2	-	-	1	2	1	2	25000	25000	50000
2.	CRO dual trace 15 MHz.	1	2	-	-	1	2	1	2	15000	15000	30000
3.	CRO dual trace 10 MHz.	2	2	1	2	3	4	3	4	10000	30000	40000
4.	Multimeter, 20 K Ohm/volt sensitivity, 1% accuracy in D.C. voltage range, Max. D.C. voltage range 2500 V, A.C Current.	2	3	-	-	2	3	2	3	2500	5000	7500
5.	Multimeter, Digital hand held 3 1/2 digit, 0.3% accuracy 1000 VD.C. and 20 m ohm resistance range protected against transients.	2	3	1	2	3	5	3	5	2000	6000	10000
6.	Logic Probe	15	30	5	10	20	25	20	30	300	6000	9000
7.	Logic board/trainer including +5 Volt, 1Amp q15 V, 0.3 Amp. power supply and bread board and flexible leads.	10	14	-	-	10	14	10	14	3500	35000	49000

8.	Microprocessor trainer kits with 8085 system (EC 85 or similar).	-	-	8	10	8	10	8	10	8000	64000	80000
9.	Component rack 144 tray (small) & 24 large tray.	2	2	1	1	3	3	3	3	5000	15000	15000
10.	Consumable material such as components ICs, resistors transistors etc.	LS	LS	LS	LS	LS	LS	LS	LS	--	50000	60000
11.	Miscellaneous	LS	LS	LS	LS	LS	LS	LS	LS	--	40000	45000

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## 4.ELECTRONICS WORKSHOP

## 5.ELECTRONIC INSTRUMENTS AND MEASUREMENTS LAB

S.No.	Name of the Equipment/ Board/Kit Etc.	Electronics Work-Shop		Electronics Inst. & Measurements Lab		Total		Total No. Recommended		Rate per Piece	Total Cost	
		Intake 30	Intake 45	Intake 30	Intake 45	Intake 30	Intake 45	Intake 30	Intake 45	In Rs.	Intake 30	Intake 45
1.	D C Voltmeter (1K/2K/10K/20K Ohm per Volt)	-	-	4	4	4	4	4	4	200	800	800
2.	Gen.purpose multimeter	2	3	2	3	4	6	3	4	1000	4000	
3.	Electronic multimeter	2	3	3	4	5	7	3	5	2500	15000	
4.	IC regulated power supply 0-15 V; 1 A	1	1	2	3	3	4	2	3	1500	3000	4500
5.	Transistor power supply 0-30 V / 1 A variable.	1	1	1	2	2	3	2	2	2000	4000	4000
6.	Unregulated power supply 0-30 V; 1 A	1	1	1	1	2	2	1	1	1000	1000	1000
7.	A.F. signal generator.	2	3	4	5	6	8	3	4	1500	4500	6000
8.	RF signal generator	2	3	5	6	7	9	4	5	2500	10000	12500
9.	Function Generator	1	2	1	2	2	4	1	2	3000	3000	6000



10.	Std. Signal Generator	2	3	1	1	3	4	1	2	5000	5000	10000
11.	AC/DC Voltmeter (M.I.type)	-	-	2	4	2	4	2	4	200	400	800
12.	Sensitive multirange ammeter	-	-	1	2	1	2	1	2	500	500	1000
13.	Calibrated CRO (Single beam 10 MHz)	-	-	1	2	1	2	1	2	15000	15000	30000
14.	Dual trace Cal. CRO 10 MHz	1	2	2	3	3	5	2	3	20000	4000	6000
15.	Q Meter	-	-	1	2	1	2	1	2	5000	5000	10000
16.	RLC/Universal Bridge	-	-	1	2	1	2	1	1	4000	4000	4000
17.	Universal Digital Freq. Counter	-	-	1	2	1	2	1	1	10000	10000	10000
18.	Distortion Factor Meter	-	-	1	1	1	1	1	1	6000	6000	6000
19.	Decade Resistance Box	-	-	1	2	1	2	1	1	1000	1000	1000
20.	Decade Cap. Box	-	-	1	2	1	2	1	1	1500	1500	1500
21.	Std. Inductance (Diff. Value)	-	-	4	6	4	6	4	6	200	800	1200
22.	Charts, Models, displays for safety/rules etc.	LS	LS	-	-	LS	LS	LS	LS	--	2000	2000
23.	Digital Multimeter	1	2	3	3	3	5	2	4	4000	8000	16000
24.	Single Phase Variac 5 Amp, 15 Amp (Oil/Air cool)	4	5	1	2	5	7	5	6	1500 av.	7500	9000
25.	Gen. Purpose CRO; 5 MHz.	1	2	-	-	1	2	1	1	10000	10000	10000
26.	Tools Kit (SET)	15	15	-	-	15	15	15	15	30000	4000	5000
27.	Misc. Active Components	LS	LS	-	-	LS	LS	LS	LS	--	8000	10000
28.	Misc. Accessories as per req.	LS	LS	-	-	LS	LS	LS	LS	--	2000	3000
29.	Misc. Passive components.	LS	LS	-	-	LS	LS	LS	LS	--	3000	4000

30.	Working Models of analog and digital equipment	LS	LS	-	-	LS	LS	LS	LS	--	5000	8000
31.	Drill Machine with stand	1	2	-	-	3	5	2	3	2000	4000	6000
32.	Misc. Items & Consumable	LS	LS	-	-	LS	LS	LS	LS	--	40000	60000

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7. LEARNING RESOURCE MATERIALS

1.	LCD Projector with Screen	1	--	20000
2.	Handicam	1	--	30000
3.	Cutting, Binding & Stitching equipment.	1	--	30000
4.	Desk Top Computer with Internet Core i5/i7- 760, Processor, Genuine Windiw 7, Professional 18 inch HD, Flat Panel Monitor Optical Mouse, Key Board & all related media or latest version	1	--	40000
5.	Home Theater Support Disc type CD. CDR/CDRW DVDR/DVDRW, VCD Supported with USBPort Support-DIVX/JPEG/MP3	1	--	25000
6.	Commerical P A System 16 W-220W output, AC & 24V DC Operated, 5 Mic.& 2 Auxilary input, Speaker output 4 Ohm, 8 Ohm, 17 V & 100 V	1	--	20000
7.	Interactive Board	1	--	50000

Note :

1. This center will be only one at the institute level irrespective of all branches.

1ANNEXURE-QUESTIONNAIRE

INSTITUTE OF RESEARCH,DEVELOPMENT AND TRAINING U.P.KANPUR -208024

SUBJECT: Questionnaire for ascertaining the job potential and activities of PG diploma holder in Computer Hardware & Networking.

PURPOSE: To design and develop one Year (Two Semester)PG diploma curriculum in Computer Hardware & Networking

NOTE: 1.Please answer the questions to the points given in the questionnaire.  
2.Any other point or suggestion not covered in this questionnaire may be written on a separate paper and enclosed with the questionnaire.

1.Name of the organisation:\_\_\_\_\_

2.Name& Designation of the officer \_\_\_\_\_  
filling the questionnaire \_\_\_\_\_

3.Name of the department/section/ \_\_\_\_\_  
shop \_\_\_\_\_

4.Importent functions of the \_\_\_\_\_  
department/section/shop \_\_\_\_\_

5.Number of diploma holder employees  
under your charge in the area of \_\_\_\_\_  
Computer Hardware& Networking.

6.Please give names of modern equipments/machines handled by a diploma holder in Computer Hardware & Networking.

- |    |    |    |
|----|----|----|
| 1. | 2. | 3. |
| 4. | 5. | 6. |

7.What proficiencies are expected from a diploma holder in Computer Hardware& Networking.

- |    |    |    |
|----|----|----|
| 1. | 2. | 3. |
| 4. | 5. | 6. |

8.Mention the approximate percentage of the following desired in Diploma teaching.

- 1. Theoretical knowledge -----%
- 2. Practical knowledge -----%
- 3. Skill Development -----%

9. Do you think " on the job training" / Industrial training should form a part of curriculum. ( Yes/ No)  
if yes then

- (a) Duration of training -----
- (b) Mode of training
  - 1. Spread over different semesters
  - 2. After completion of course
  - 3. Any other mode

10. What mode of recruitment is followed by your organisation.

- 1. Academic merit
- 2. Written test
- 3. Group discussion
- 4. Interview
- 5. On the job test.

11. Mention the capabilities/ Qualities looked for while recruiting diploma holder in Computer Hardware & Networking.

- (a) Technical knowledge -----
- (b) Practical skill -----
- (c) Etiquettes and behaviour -----
- (d) Aptitude -----
- (e) Health, habit and social background -----
- (f) Institution where trained -----

12. Does your organisation have any system for the survey of Home articles of different countries/States. Yes/No

13. Does your organisation conduct field survey to know users views regarding. Yes/No

- 1. Home Articles for different age groups and sex.
  - 2. Effect of climatic conditions
  - 3. Any other
- If yes ; Please give brief account of each.

14. Which type of assignment do you suggest for an entrepreneur in Computer Hardware & Networking.

15. In which types of organisations can a diploma holder in Computer Hardware & Networking can work or serve.

- |   |   |   |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |

16. Job prospects for the diploma holder in Computer Hardware & Networking the next ten years in the state / country.

17. In your opinion what should be the subjects to be taught to a diploma student in Computer Hardware & Networking.

Theory	Practical
18. Kindly mention particulars regarding topics/areas which should be given more emphasis in the curriculum .	

Theory	Practical
19. Kindly state whether your organisation can contribute towards improvement of curriculum in above field.	
Yes/ No	
If yes : Please give names of experts in your organisation to whom contact.	

20. Kindly give your valuable suggestions for being considered at the time of finalisation of curriculum.

21. What changes in technologies are to be incorporated in the development of curriculum in Computer Hardware & Networking.

( Signature )

Kindly mail the above questionnaire duly filled to:-

Gaurav Kishor Kanaujiya  
Lecturer-IT  
Institute of Research,Development & Training,U.P.  
Kanpur-208024

( Please note that all information in this survey is confidential for the use of curriculum design only )

## 2ANNEXURE- FIELD EXPOSURE SCHEDULE

All the students after annual examination will undergo industrial training for a period of two week in Industries dealing with computers. It will in all respect end by the end of summer vacation. Project examination will be held after training It will be arranged and supervised by institute staff. The performa for preparing a report of his stay there in the industry given below can be taken as a guide for the purpose.

1. Name & Address of the organisation
2. Nature of the industry and its activity.
3. Date of
  - i. Joining
  - ii. Leaving
4. Details of the sections of the industry visited.
  - i. Name of tools, equipments instruments in use.
  - ii. Activities of the section
  - iii. Study of the components, devices used in complete assemblies.
  - iv. Soldering and de-soldering techniques used in circuit fabrication.
  - v. Study of PCB Lay out developing and preparation.
  - vi. Checking and testing of the components used.
  - vii. Final checking of the product.
  - viii. Description of quality control measures taken in industry.