

CURRICULUM  
OF  
ONE YEAR PG DIPLOMA COURSE  
IN  
COMPUTER HARDWARE & NETWORKING

**INSTITUTE OF RESEARCH, DEVELOPMENT & TRAINING**

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# **ONE PG YEAR DIPLOMA COURSE OF COMPUTER HARDWARE & NETWORKING**

## **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 : Annual System/Semester**
- 5. Intake : 60**
- 6. Admission Qualification : Graduate in any Discipline**

## **SUBJECTS**

1. Computer Hardware & Maintenance
2. Operating Systems
3. Computer Networking
4. Basics of Electronics & Measuring Instruments
5. Principle of Digital Electronics
6. Microprocessor & its Application
7. Network Administration
8. Project + Field Exposure

## **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 organisations 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 omni present 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 thier utilisation. 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. Shopfloor manager/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.

Advises the customer on site preparation and checks the site.

Install the systems and tests 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.

**STUDY & EVALUATION SCHEME**  
**FOR**  
**ONE YEAR PG DIPLOMA IN**  
**Computer Hardware & Networking**  
(Effective from session 200 -200 )

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.	COMPUTER HARDWARE & MAINTENANCE	03	04	2.5	50	20	70	03	90	40	130	200
2.	OPERATING SYSTEMS	02	04	2.5	50	20	70	03	90	40	130	200
3.	COMPUTER COMMUNICATIONS NETWORKING	03	03	2.5	50	20	70	03	90	40	130	200
4.	BASICS OF ELECTRONICS & MEASURING INSTRUMENTS	02	04	2.5	50	20	70	03	90	40	130	200
5.	PRINCIPLE OF DIGITAL ELECTRONICS	03	03	2.5	50	20	70	03	90	40	130	200
6.	MICROPROCESSOR & ITS APPLICATION	04	04	2.5	50	20	70	03	90	40	130	200
7.	NETWORK ADMINISTRATION	02	04	03	50	20	70	03	90	40	130	200
8.	PROJECT	–	03	–	–	–	–	VIVA	70	30	100	150
	FIELD EXPOSURE	–	–	–	–	–	–		30	20	50	
	<b>TOTAL</b>	19	29		350	140	490		730	330	900	1550
	Games/NCC/Social and Cultural Activity + Discipline (30 + 20)											50
	<b>TOTAL</b>											<b>1600</b>

- NOTE: (1) Each period will be of 50 minutes duration.  
(2) Each session will be of 32 weeks.  
(3) Effective teaching will be atleast 25 weeks.  
(4) Remaining periods will be utilised 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 20 marks & 30 by Project examiner for viva and report presented by the student.

## List of Experts

Workshops held on 11-11 2008 & 24-02-2009 in which the suggestion, contribution and support of following experts is a matter of obligation to I.R.D.T.

1. Sri.Alok Tiwari  
Technical Director  
NIC,Kanpur Dehat
2. Sri Peeyush Misra  
Senior Manager  
UPTEC, The Mall ,  
Kanpur
3. Sri Ashraf Ali  
Head Computer,  
GGP,Lucknow
4. Sri L.S Yadav  
Head Computer,  
GP,Kanpur
5. Sri Ashok Kushwaha  
Head Computer,  
GP,Lucknow
6. Sri Kamlesh Tiwari  
Lec Computer,  
GP,Kanpur
7. Sri S.K.Srivastava  
Lec Computer,  
GGP,Allahabad
8. Smt. R.P.Alam,(Curriculum Incharge)  
Asst.Professor,I.R.D.T,Kanpur.

## 1.COMPUTER HARDWARE & MAINTENANCE

		<b>L</b>	<b>P</b>
		<b>3</b>	<b>4</b>
S.NO.	Topics	L	P
1	Basic Computer System & Peripherals	10	-
2	Mother Board	10	-
3	Serial Devices	10	-
4	Storage Devices	10	-
5	Parallel Devices	10	-
6	Types of Software	10	-
7	Boot Process	4	-
8	Power Supply	3	-
9	Types of PC's	3	-
10	PC Tools	3	-
<b>Total</b>		<b>75</b>	<b>100</b>

### 1.BASIC COMPUTER SYSTEM & PERIPHERALS: –

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

### 2. MOTHER BOARD:

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.

### 3. SERIAL DEVICES:-

- a. Key Board: Switches, Keyboard organization, Key board type, Wireless Keyboard Trouble shooting.
- b. Mouse: Mouse type- Scroll & Optical Mouse, Function Connecting Mouse, Trouble shooting Mouse.
- c. Ports    d.Modems

### 4. STORAGE DEVICES:-

- a. HDD: 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.
- b.FDD: FDD types and working and its related problem.
- c CD and DVD drives- ROM and Writer, COMBO drives, , Mass Storage Devices.
- d.USB Devices:- Hub, Pen Drives

### 5. PARALLEL DEVICES:-

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

### 6. TYPES OF SOFTWARE- System Software, Application Software driver Software Installation, Windows and other S/w & Anti Virus

### 7. BOOT PROCESS : Setting of CMOS, Setup

8. POWER SUPPLY : Operating characteristics, Types and maintenance.
9. TYPES OF PC'S : Desktop. Laptop. Palmtop. BIOS/ CMOS setting.
10. PC TOOLS

### **List of Practicals**

1. (I) Study of devices on motherboard  
(II) Study of Key board & Keyboard decoder  
(III) Study of Video Adopter & display controllers  
(IV) Study of Floppy Drive, CD,DVD,pen Drive and Hard Disk.  
(V) Study of Multifunction Input/Output controllers
  
2. Troubleshooting & repair of following equipment  
(I) Dot Matrix Printer, Laser, Inkjet Printer.  
(II) Digital Plotter  
(III) C. P. U.  
(IV) Disk Drive  
(V) Scanner
  
3. Study and Trouble Shooting of  
(I) Network  
(II) Power Supplies.

## 2. OPERATING SYSTEM

**L P**  
**2 4**

S.NO.	Topics	L	P
1	Introduction	8	-
2	File System	8	-
3	CPU & Disk	8	-
4	Memory Management	8	-
5	Features of Windows	9	-
6	Linux	9	-
<b>Total</b>		<b>50</b>	<b>100</b>

1. INTRODUCTION -What is O.S., Multiprogramming, Time Sharing, Real Time System, and Multitasking.
2. FILE SYSTEM : Types of file Sequential, index, direct access, creation and updates of file and access method. Directory system.
3. C.P.U.& DISK, Drum Scheduling. Scheduling concepts, Scheduling Algorithm, Multiprocessor, FCFS Scheduling.
4. MEMORY MANAGEMENT Swapping, multiple partitions, Paging, Segmentation, virtual memory , Demand paging, page replacement.
5. FEATURES OF WINDOWS- Types of Window – XP/ 2000/Vista & differences, Boot Process, Configuring, Installation, GUI, What is interface, Windowing, windows environment, menus of Dialog boxes, Concepts of Icon, Basic Windows Security System. Functions of Programs, Documents, Setting, Run Command.
6. LINUX – Installation, File System, Tools and Commands, RHL. LAMP

### List Of Practicals

1. Exercise on Widows XP/2003/VISTA
2. Examination of corrupt systems
3. Exercises on Linux.
4. Installing Drives
5. Detail Study of “MANAGE” Computer

### 3. COMPUTER COMMUNICATIONS & NETWORKING

		<b>L</b>	<b>P</b>
		<b>3</b>	<b>3</b>
<b>S.NO.</b>	<b>Topics</b>	<b>L</b>	<b>P</b>
1	Basic Data Communication	2	-
2	Data Transmission	10	-
3	Transmission Media	10	-
4	Protocols & Architecture	7	-
5	Data Link	7	-
6	Local Area Network	10	-
7	Networking Devices	5	-
8	Network Layer	12	-
9	Transport Protocols	4	-
10	Wide Area Networks	4	-
11	Basic Video Conferencing	4	-
<b>Total</b>		<b>75</b>	<b>75</b>

1. BASICS OF DATA COMMUNICATION :- Types of Data , Difference of Data & Information.

2. DATA TRANSMISSION : Analog Transmission, Digital Transmission. Five Components of data transmission, characteristics of data communication. Modes of data Transmission- Simplex Half duplex / Full Duplex. Synchronus & Asynchronus Data Communication. Types of Network- LAN,MAN,WAN,

3. TRANSMISSION MEDIA : STP (Shielded Twisted Pair), UTP (Unshielded Twisted Pair) ,Coaxial Cable, Cabling Standards for LAN using UTP Cable, How to do Crimping, Building Straight Through Cable and Cross Cables, Testing Cable Continuity.

Twisted pair, Coaxial Cable, Optical Fibers, Wireless Transmission, Microwave, Radio Waves and their respective connectors, IEE standards.

4. PROTOCOLS AND ARCHITECTURE: OSI reference models, TCP/IP Protocol suit.

5. DATA LINK CONTROL AND PROTOCOL: Flow Control - Stop and Wait, Sliding window, Error Detection, by parity & CRC, Error connection, humming code, HDLC.

6. LOCAL AREA NETWORK : LAN architecture, LAN topologies - Bus/Tree LAN, Ring LAN, Star LAN, Wireless LAN, Ethernet and Fast Ethernet (CSMA/CD), Token Bus, token ring and FDDI.

7. NETWORKING DEVICES- Hub, switch, Bridge, Routers, Repeaters, gateways, Modems.

8. NETWORK LAYER- Introduction , Routers, Routing Algorithms, Congestion, Sub networking and Class Less Inter Domain ( CCIDR),

NAT and PAT, Control algorithm, IP Addressing, DNS, Modulation – AM, FM, PM, QAM, Modem Wavelength multiplexing- FDM, TDM, WDM. Working of Internet- Web Server, Browser, HTTP, HTTPS, Web Services, Internet Architecture, IIS, Web Application.N/w Security – Cryptography.

9. TRANSPORT PROTOCOLS: Transport services, TCP, UDP.

10 WIDE AREA NET WORKS: WAN, Circuit switching, Packet switching, Frame relay, ATM, ISDN.

11. BASIC VIDEO CONFERENCING, Tele Conferencing, Mobile Computing, DAMA, PAMA, Types of Cameras and Micro phones.

### **List Of Practicals**

1. To connect computers in different ways in a LAN ( Topologies-star, ring, bus, tree)
2. To connect and understand different network devices used in LAN- Hubs, Switches, Routers, Bridges, Repeaters, Gateways, Modems.
3. To study the constructional details of transmission media- co-axial cables, twisted pair cables, optical fibre cable.
4. To create network cable using RJ 45 connectors.
5. Connections of two hubs by creating cross over connections.
6. To install a network interface card ( NIC)
7. To install TC/IP protocol and configure its advance property.
8. To locate MAC address of computer.
9. To Install network printer.
10. Installing IIS, making web server, web directory, connection via remote desktop, to know browsers.
11. To identify different problems of network exm- no network, card problem, cable problem, IIS problem.

## 4. BASICS OF ELECTRONICS & MEASURING INSTRUMENTS

		<b>L</b>	<b>P</b>
		<b>2</b>	<b>4</b>
<b>S.NO.</b>	<b>Topics</b>	<b>L</b>	<b>P</b>
1	Passive components	4	-
2	Semiconductor physics	3	-
3	Semiconductors diodes	6	-
4	Transistor:	10	-
5	Integrated circuits	5	-
6	Regulated power supply	10	-
7	Basic measuring instruments	12	-
<b>Total</b>		<b>50</b>	<b>100</b>

1. PASSIVE COMPONENTS- Resistors, Capacitors, Inductors, Transformers – Types, Working and Properties. Voltage and Current Sources.
2. SEMICONDUCTOR PHYSICS
  - 2.1 Analyzing conductivity of elements, Types of conductors
  - 2.2 Pure (intrinsic) semiconductors-Silicon, Germanium: Thermal Generation (formation of charge carrier-Positive & Negative charge carriers i.e. electron-hole pair) , p-n junction.
3. SEMICONDUCTORS DIODES:
  - 3.1 Effect of applying electrical potential across a P-N Junction in the following ways:
    - (a) Positive of the source to 'P' type terminal & Negative to the 'N' type terminal
    - (b) Positive of the source to 'N' type terminal & Negative to the 'P' type terminal.
  - 3.5 Half wave rectifier, Full wave rectifier using C.T. '1 transformer, using bridge circuits)
  - 3.6 Special purpose diodes: Zener diode, Vreactor diode, Photo Diode, Light emitting Diode (LED), their characteristics and uses.
- 4 TRANSISTOR:
  - 4.1 Growing a Crystal having two P-N Junction back to back (ie.PNP & NPN) Junction transistor structure transistor action of transistor in FF,RR,FR and RF biasing; working of transistor relation between different currents in a transistor
  - 4.2 Various configurations of transistor (CB,CE, CC);relation between. Transistor action in three configurations; Comparison between the three configurations of transistor;
  - 4.3 Field - Effect transistor ( JFET, IGFET, MOSFET), Photo Transistor
  - 4.4 Biasing of Transistor
5. INTEGRATED CIRCUITS:
  - 5.1 Introduction;
  - 5.2 Manufacturing proc ssp
  - 5.3 SSI, MSI, LSI, VLSI, ICs;
  - 5.4 Linear and Digital ICs;
  - 5.5 Switching and Gating ICs;
  - 5.6 DTL, TTL, ICs;
6. REGULATED POWER SUPPLY
  1. Basic regulator using Zener Diode
  2. IC based power supplies Block diagram major specification, pin configuration their measurements
  3. Basic of switch mode power supply (SMPS)
  4. Basic of uninterrupted power supply
  5. Concept and Practices of Earthing

## 7. BASIC MEASURING INSTRUMENTS

7.1 Multimeters – Electronics & Digital – Basic principles of measurement & significance of specifications

7.2 Cathode Rays Oscilloscope – Block diagram & basic working, specification & their significance, Different uses of CRO, Different types of CRO – dual trace, delayed sweep & storage (Brief introduction)

7.3 Impedance Bridge, Q Meters – Basic working principle of simple RLC & Digital RLC bridges.

Working principle of Q Meter, Measurement by all given device.

### List of Practicals:-

1. Ohm's Law verification.
2. To verify laws of series of parallel connection of resistance.
3. Simple circuits showing the use of capacitance and inductance.
4. Study of transfer, its use in left type of circuits.
5. Semiconductor diode characteristics.
  - 5.1 Identifications of types of packages, terminals and noting different ratings using data books for various types of semiconductor diodes ( Germanium, point contact, silicon low power and high power and switching diode)
  - 5.2 Plotting of forward V-I characteristics for a point contact and junction P-N diode ( Silicon & Germanium diode)
6. Rectifier Circuits using semiconductor diode, measurement of input and output voltage and plotting of input and output wave shapes.
  - 6.1 Half wave rectifier
  - 6.2 Full wave rectifier ( center tapped and bridge rectifier circuits.)
7. To plot forward and reverse V-I characteristics for a zener diode.
8. To plot wave shapes of a full wave rectifier with shunt capacitor , series inductor and filter circuits.
9. To plot the input and output characteristics and calculation of parameters of a transistor in common base configuration.
10. To plot input and output characteristics and calculation of parameters of a transistor in common emitter configuration.
11. Transistor Biasing circuits.
  - 11.1 Measurement of operating point (  $I_c$  &  $V_{ce}$ ) for a fixed bias circuit.
  - 11.2 Potential divider biasing circuits.
12. Plot the FET characteristic and determination of its parameters from these characteristics.
13. Identification of some popular IC of 74 and 40 series with pin number and other details.
14. Measurement of voltage, Frequency, time period, phase angle and delay time using CRO : ( use of Lissajous Figures)
15. To test a power supply for ripple, line and load regulation, Tracing of wave form, To findout operating range of power supply.
16. Measurement of R.L. and C using a LRC bridge/universal bridge.

## 5.PRINCIPLES OF DIGITAL ELECTRONICS

(Common with Electronics Engg)

**L**    **P**  
**3**    **3**

S.NO.	Topics	L	P
	Part-1		
1	Introduction	3	-
2	Number System	6	-
3	Codes, codes conversion & Parity	3	-
4	Logic Gates	6	-
5	Logic Simplification	6	-
6	Logic Families & Digital ICs	6	-
	Part-2 Combination Logic Circuits		
7	Arithmetic operations	6	-
8	Encoders, Decoders & Display Devices Associated Circuits, Multiplexer & De multiplexer	9	-
	Part-3 Sequential Logic Circuits		
9	Flip Flops	4	
10	Counters	8	
11	Shift Registers	6	
	Part-4		
12	Memories	6	
13	A/D and D/A converters	6	
<b>Total</b>		<b>75</b>	<b>75</b>

### 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 ckt 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. ARITHMETIC CIRCUITS

- 14.1 Basic arithmetic logic units application
- 14.2 Block diagram explanation of binary multiplier circuits

### List of practicals

1. Do at least 20 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. Familiarisation 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 aithmetic and logic operations.

**6.MICRO PROCESSOR**  
(Common with Electronics Engg)

**L    P**  
**4    4**

S.NO.	Topics	L	P
1	Overview of Microprocessor System	4	-
2	Memory of a Microprocessor	12	-
3	C P U & CONTROL	12	-
4	Introduction of 8085 Microprocessor	12	-
5	Introduction of 8086 Microprocessor	12	-
6	Assembly Language Programming	12	-
7	Programmes I/O	12	-
8	Memory Interfacing	12	-
9	Advance Microprocessor and Micro Controllers	12	-
<b>Total</b>		<b>100</b>	<b>100</b>

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 Strobes
    - (e) Power supply inputs.
  - 2.4 Extension of memory
    - In terms of word length and depth

3. CPU & 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

Note:

Study of Popular ICs Read/Write, Chips- 8155/8156, 2114,2148,2164. ROM chips- 8355, 2716, 2732, 8755. Other support chips- 8279, 8257, 8275, 8205.

#### **List of Practical:**

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.

## 7. NETWORK ADMINISTRATION

**L    P**  
**2    4**

S.NO.	Topics	L	P
1	Introduction	10	-
2	User & Group Managements	5	-
3	Domain User Account	5	-
4	Installing and Configuring Terminal Services	5	-
5	Installing DNS	5	-
6	Installing and Configuring DHCP	5	-
7	Configuring & Implementing routing Services	5	-
8	Planning implementing an OU structure	5	-
9	Local and domain security policies	5	-
<b>Total</b>		<b>50</b>	<b>100</b>

1. Introduction to Windows 2000, Professional and Windows 2003 server, Installation & configuration of Windows 2000 professional, Installation & configuration of Windows 2003 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 windows 2003 networks.

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. Configuring the user environment by using group policy. Deploying software through group policy.

## **List Of Practicals**

- 1.Installation & configuration of Windows 2000 professional.
- 2.Installation & configuration of Windows 2003 server.
- 3.Installing and Configuring Terminal Services
- 4.Installing DNS. Implementing DNS in windows 2003 networks.
- 5.Installing and configuring DHCP.
- 6.Configuring & Implementing routing services

## 8 .PROJECT

L P  
- 3

### 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/frbriicate/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.



## 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. 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	Floor Area Sq.m.
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) including kitchen & store	45	Sq.m

## [E] STAFF RESIDENCES

		Sq.m
1. Principal	1	100
2. Head of the Department	1	100
3. Lecturer	4	320
4. Non teaching & Supporting staff	8	480
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 LAB

S.no.	Description	Qty.	APPROX. COST (in Rs.)
1.	<p>Latest Version-Core-2 Dual Processor                      2 MB L2 Cache, 2.4 Ghz ofr Higher                      1 GB DDR2 RAM,160 GB SATA HDD,72K RPM                      MONITOR COLOUR 17" TFT                      DVD Writer, Multi Media Kit with                      Speaker &amp; Microphone                      FDD - 1.44 MB                      Key Board - Multimedia                      Mouse - Optical Scrool Fibre Mouse                      32 Bit PCI ETHERNET CARD(10/100) Mbps                      Internal Modem, Pen Drive 2GB, Blue Tooth                      Pre loaded Windows XP/2000/VISTA                      Pre loaded latest Anti Virus with licence media and                      manual with UPS 660 VA</p> <p style="text-align: center;">OR</p> <p>Computer of latest Specification</p>	62	20,000,00=00 (60+2Server)
2.	Lap Top (Latest Version)	04	300000.00
3.	<p>Software :(With Licence)</p> <p>i WINDOWS - XP/2000/VISTA                      ii ORACLE 9i or Latest Windows based                      20 USERS) &amp; Development (Latest)                      iii. VISUAL STUDIO (professional)                      iv. MS OFFICE XP                      v. COMPILER - 'C',C++, JAVA                      vi. Unix &amp; Linux                      vii. Front Pange, Internet Explorer,                      Page Maker                      Corel Draw, Dream Weaver                      viii. Personal Web Server, HTML, IIS                      ix. Tally</p>		
4.	<p>3. Hardware</p> <p>i. Switch-16,8,24 Port                      all accessories related to Networking.                      ii.Scanner- A4/Auto lighter Scanner</p>	02	100000.00  25000.00
5.	<p>132 Column 600 CPS or faster                      9 Pin dot matrix printer with                      500 million character head life</p>	02	50000.00
6.	Laser Jet-A4,All In One (2 Each)	04	50000.00
7.	Desk Jet-A4, Photo Smart(2 Each)	04	40000.00
8.	<p>5 KVA on line UPS with minimum                      30 minute battery backup along                      with sealed maintenance free                      batteries. Provision for connecting                      external batteries with network connectivity. (For 2 Labs)</p>	04	400000.00

9.	Split Air Conditioner 1.5 tones capacity with ISI mark along with electronic voltage stabilizer with over voltage and time delay circuit	08	300000.00
10.	Room preparation and furniture	LS	
11.	Cat-6 cabling for network	LS	
12.	2 KVA Inverter Cum UPS	02	50000.00
13.	Digital Camera	01	25000.00
14.	Fire Extinguisher (2 Kg.)	04	15000.00
15.	Fire Extinguisher (5 Kg.)	04	30000.00
16.	Vacuum Cleaner	02	15000.00
17.	LCD Projector	02	200000.00
18.	Pen drive 1GB, 2GB, 4 GB	10	15000.00
19.	DVD writer External	02	5000.00
20.	HDD External 160 GB	02	10000.00
21.	PDA (Latest Configuration)	02	10000.00
22.	Broadband For Internet(Speed Min. 8mbps)	04	
23.	USB Modem	02	10000.00
24.	Generator 10 KVA Water Coolant	01	100000.00

NOTE :- All the above items should be equally distributed in the 2 computer centres .

## HARDWARE & PROJECT LAB

S.no.	Description	Qty.	APPROX. COST
1.	Digital Multimeter	12	24,000
2.	Power Supply	10	30,000
3.	Latest Version-Core-2 Dual Processor 2 MB L2 Cache, 2.4 Ghz or Higher,1 GB DDR2 RAM,160 GB SATA HDD, 72K RPM, CD/DVD Drive	10	4,00000
4.	Printer (600 cps) a) Dot Matrix b) Desk Jet c) Laser d)Line Printer	2 each	5,00000
5.	Constant Voltage Transformer	04	32,000
6.	PC Card Sets (One Mother Board, 4 Cards)	02	20,000
7.	Spike Buster	10	5,000
8.	Tool Kit	10 set	50000
9.	Digital Plotter	01	25000
10.	Scanner	01	10000

## ELECTRONICS LABORATORY

## 1Basic Electronic Lab.

S.No.	Name of the Equipment/ Board/Kit Etc.	Elex. Components & & Devices . Lab.		Rate per Piece	Total Cost	
		Intake		In Rs.	Intake	
		30	60		30	60
1.	Auto Oscillator	2	4	2000	4000	8000
2.	Multimeter, 20 K. Ohm per volt Sensitivity, q 1% 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	LS	LS	--	
22.	Miscellaneous	LS	LS	--	

2 Principles of Digital Electronics Lab.  
3 Microprocessors And Applications Lab.

S.No.	Name of the Equipment/ Board/Kit Etc.	Principles of Digital Eltx. Lab.		Micropro- cessors & Applicat- ion Lab.		Total		Total No. Recommen- ded		Rate per Piece  @ Rs.	Total Cost	
		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 V D.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 q 15 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

4.ELECTRONICS WORKSHOP  
5.ELECTRONIC INSTRUMENTS AND MEASUREMENTS LAB

S.No.	Name of the Equipment/ Board/Kit Etc.	Electron- ics Work- Shop		Electro- nics Inst. & Measurem ents Lab		Total		Total No. Recommen- ded		Rate per Piece	Total Cost	
		Intake 30	45	Intake 30	45	Intake 30	45	Intake 30	45	In Rs.	Intake 30	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	3000	4000
3.	Electronic multimeter	2	3	3	4	5	7	3	5	2500	7500	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

## LEARNING RESOURCE MATERIALS

1.	Overhead Projector with screen	1	--	20000
2.	Photo Copier	1		150000
3.	Audio CD Recorder cum	1	--	10000
4.	Pen Drive 1GB,2GB,4GB Player	10		10000
5.	DigitalCamera/Handy Cam Computer centre to be used for print outs)	1		25000
6.	Cutting, Binding & Stitching equipment.	1	--	30000
7.	L. C. D. Projector	2	--	200000
8.	DVD Writer cum Player	2	--	10000
9.	Colour Television	1	--	15000
10.	Radio (with all bands)	1	--	2000
11.	Fire Extinguisher 2Kg., 4Kg.	4 each		45000
12.	Vaccum Cleaner	2	--	15000

### 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



## 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.

