



# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL DIPLOMA IN COMPUTER HARDWARE & MAINTENANCE

SEMESTER: **THIRD**  
COURSE CODE: **301**  
NAME OF COURSE: **COMPUTER ARCHITECTURE**  
COMMON WITH PROGRAM (S):

SCHEME: **Jul.09**  
PAPER CODE: 6344

## **RATIONALE**

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Diploma in Computer Hardware & maintenance. have to be conversant with computer, its terminology and functioning. Computer architecture is concerned with the structure and behavior of the various functional modules of the computer and their interaction, the course provides the necessary understanding of the hardware operation of digital computers..



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**SEMESTER: THIRD**

**COURSE CODE: 301**

**NAME OF COURSE: COMPUTER ARCHITECTURE**

**COMMON WITH PROGRAM (S): Computer Science & Engineering**

**SCHEME: Jul.09**

**PAPER CODE: 6344**

**SCHEME OF STUDIES AND SPECIFICATION TABLE**

Lectures: 5 Hrs. per week

**SCHEME OF STUDIES**

<b>Sr. No.</b>	<b>TOPICS</b>	<b>THEORY (HRS)</b>
<b>1.</b>	Computer Architecture	<b>10</b>
<b>2.</b>	Basic Computer Organization And Design	<b>10</b>
<b>3.</b>	Central Processing Unit	<b>15</b>
<b>4.</b>	Input Output Organization	<b>15</b>
<b>5.</b>	Memory Organization	<b>14</b>
<b>6.</b>	Advance Processor Architectures	<b>11</b>
	<b>TOTAL</b>	<b>75</b>



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### COURSE CONTENT

Lectures: **5** Hrs. per week

Sr. No.	COURSE CONTENT	Hours of study
<b>1</b>	<b>COMPUTER ARCHITECTURE</b> Register Transfer and Micro operations, Register Transfer: Bus and Memory Transfers. Three-State Bus Buffers, Memory Transfer. Arithmetic Micro operations: Binary Adder, Binary Adder Subtractor, Half Adder and Full Adder Binary Incrementer. Arithmetic Circuit, Logic Micro operations: List of Logic Micro operations, Hardware, Implementation. Shift Micro-operations: Hardware Implementation	<b>10</b>
<b>2</b>	<b>BASIC COMPUTER ORGANIZATION AND DESIGN</b> Instruction Codes: Stored Program Organization, Indirect Address Computer Registers: Common Bus System, Computer Instruction: Instruction Set Completeness Timing and Control Instruction Cycle: Fetch and Decode, Type of Instruction, Register-Reference Instructions Memory-Reference Instructions: AND to AC, ADD to AC, Load to AC, Store to AC, Branch Unconditionally, Branch and Save Return Address, ISZ, Control Flowchart Input-Output Configuration, Input-Output Instructions, Program Interrupt, Interrupt Cycle Complete Computer Description, Design of Basic Computer: Control Logic Gates, Control of Registers and Memory, Control of Single flip-flops, Control of Common Bus Design of Accumulator Logic: Control of AC Register, Adder and Logic Circuit, Character Manipulation, Program Interrupt.	<b>10</b>



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<b>3</b>	<b>CENTRAL PROCESSING UNIT</b> Introduction General Register Organization: Control Word Stack Organization: Register Stack, Memory Stack, Reverse Polish Notation, Evaluation of Arithmetic Expressions Instruction Formats: Three Address Instructions, Two Address Instructions, One Address Instructions, Zero Address Instructions, RISC Instructions Addressing Modes Data Transfer and Manipulation: Data Transfer Instructions, Data Manipulation Instructions, Arithmetic Instructions, Logical and Bit Manipulation Instructions, Shift Instructions Program Control: Status Bit Conditions, Conditional Branch Instructions Subroutine Call and Return, Program Interrupt, Types of Interrupts Reduced Instruction Set Computer (RISC): CISC Characteristics, RISC Characteristics, Overlapped Register Windows	<b>15</b>
<b>4</b>	<b>INPUT OUTPUT ORGANIZATION</b> <b>Peripheral Devices: ASCII Alphanumeric Characters</b> <b>Input-Output Interface: I/O Bus and Interface Modules, I/O Versus Memory Bus, Isolated versus Memory-Mapped I/O</b> <b>Asynchronous Data Transfer: Strobe Control, Handshaking, Asynchronous Serial Transfer, Asynchronous Communication Interface</b> <b>First-In, First-Out, Buffer</b> <b>Modes of Transfer: Interrupt-Initiated I/O, Software Considerations</b> <b>Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt, Priority Encoder, Software Routines,</b> <b>Direct Memory Access (DMA): DMA Controller, DMA Transfer</b> <b>Input-Output Processor: CPU-IOP Communication</b> <b>Serial Communication: Character-Oriented Protocol, Data Transparency</b> <b>Bit-Oriented Protocol</b>	<b>15</b>



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<b>5</b>	<b>MEMORY ORGANIZATION</b> Memory Hierarchy Main Memory: RAM and ROM Chips, Memory Address Map, Memory Connection to CPU Auxiliary Memory: Magnetic Disks, Magnetic Tape, CD, DVD Associative Memory: Hardware Organization, Read Operation, Write Operation Cache Memory: Associative Mapping, Direct Mapping, Set-Associative Mapping, Writing into Cache, Cache Initialization Virtual Memory: Address Space and Memory Space, Address Mapping	<b>5</b>
<b>6</b>	<b>Advance Processor Architectures</b> Instruction Pipelining, Arithmetic Pipelining, Super Scalar Processors, VLIW Processors, Parallel Processing, Flynn's Classification of Parallel Processing, Vector Computers, Array Processors, Distributed Shared Memory Parallel Computers. Cluster of Workstations.	<b>6</b>



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**COMMON WITH PROGRAM (S): Computer Science & Engineering**

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**PAPER CODE: 6344**

**BOOKS RECOMMENDED.**

1. Computer Organization & Architecture by V. Rajaraman & T. Radha Krishnan, PHI Learning
2. Computer System Architecture by P.V.S. Rao, PHI Learning

**REFERENCES**

1. Morris Mano. M., Computer System Architecture, PHI Learning.
2. Tanenbaum, 5/e, Structured Computer Organisation, PHI Learning.
3. Hwang & Brigg, Advanced Computer Architecture, McGraw Hill .
4. Stallings, 4/e, Computer Organisation & Architecture.
5. Murdocca Computer Architecture & Organization Wiley India
6. ISRD group Computer Organization TMH
7. T.K. Ghosh, Computer Organisation & Architecture TMH



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**SEMESTER: THIRD**  
**COURSE CODE: 302**  
**NAME OF COURSE: OPERATING SYSTEM**  
**COMMON WITH PROGRAM (S):**

**SCHEME: Jul.09**  
**PAPER CODE: 6345**

## **RATIONALE**

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The heart of a computer is based around its Operating System. The processor deals with request Coming from all directions asynchronously. The operating system has to deal with the problems of Contention, resource management and both program and user data management, and provide a Useful no-wait user interface. The concept of Operating System is discussed through case studies of UNIX, LINUX, Windows Vista & Windows Seven.

The course provides clear vision, understanding and working of Operating Systems.



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SEMESTER: **THIRD**  
COURSE CODE: **302**  
NAME OF COURSE: **OPERATING SYSTEM**  
COMMON WITH PROGRAM (S):

SCHEME: **Jul.09**  
PAPER CODE: **6345**

## SCHEME OF STUDIES AND SPECIFICATION TABLE

Lectures: **5**Hrs. per week  
Practical: **2** Hrs. per week

### SCHEME OF STUDIES

Sr. No.	TOPICS	THEORY (HRS)	PRACTICAL (HRS)	TOTAL (HRS)
1.	Introduction to Operating System	10	04	14
2.	Process Management	16	06	22
3.	Memory Management	16	04	20
4.	File System	10	06	16
5.	Device Management	10	06	16
6.	Protection & Security	07	04	11
7.	Other Operation System	06	00	06
	<b>TOTAL</b>	<b>75</b>	<b>30</b>	<b>105</b>

**Note:** Case studies of UNIX, LINUX and Windows Vista & Windows Seven have been included in the respective chapter.





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COMMON WITH PROGRAM (S):

SCHEME: **Jul.09**  
PAPER CODE: **6345**

### COURSE CONTENT

Lectures: 5 Hrs. per week

Sr. No.	Course Content	Hours of study
1.	<b>INTRODUCTION TO OPERATING SYSTEM</b>  1.1 Basics of Operating System, its functions, Objectives and Types of operating System 1.2 Introduction of time sharing, real time, Parallel and Distributed Multiprocessor embedded O.S. 1.3 Structure of Operating System:- System components, Operating System services, System calls and Programs, System Structure. 1.4 Case study of UNIX, Linux, Windows Vista & Windows Seven.	10
2.	<b>PROCESS MANAGEMENT</b>  2.1 Concepts of Processes; Process state (state diagram), Process Scheduling & Process control block (PCB), Operation on Processes, Threads multiprocessor scheduler. 2.2 Process Scheduling & Algorithms- Basic Concepts, Scheduling criteria, Scheduling Algorithms- FCFS, SJF, Priority, RR, Multiple queues, Multiple processor Scheduling, Real time Scheduling. 2.3 Dead Locks - Basic Concept of deadlock, deadlock detection, deadlock prevention, deadlock Avoidance, recovery from deadlock & Banker's algorithm. 2.4 Case study of UNIX, Linux, Windows Vista & Windows Seven on Process Management.	16



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<b>3.</b>	<b>MEMORY MANAGEMENT</b>  <b>3.1</b> Concept of Memory Management- Logical v/s Physical address, Cache Memory, Swapping, Allocation Techniques (contiguous and Non-contiguous), Fragmentation & Compaction. <b>3.2</b> Concepts of paging and segmentation - Paged Segmentation & Segmented Paging. <b>3.3</b> Concepts of Virtual Memory- Demand Paging, Page Fault, Page replacement and its Algorithms, Allocation of frames, Thrashing. <b>3.4</b> Case study of UNIX, Linux, Windows Vista & Windows Seven on Memory Management.	<b>16</b>
<b>4.</b>	<b>FILE MANAGEMENT SYSTEM</b>  <b>4.1</b> File System interface: File Concepts, Types of Files, Access Methods, Directory Structure, File System mounting , Protection. <b>4.2</b> File System Implementation: File System Structure, Allocation Methods (Contiguous, Non Contiguous, index allocations), Free space Management (Fragmentation & compaction), Directory implementation, File- sharing, recovery, network file system, (NFS), Efficiency and performance. <b>4.3</b> Case study of UNIX, Linux, Windows Vista & Windows Seven on Final Management System.	<b>10</b>
<b>5.</b>	<b>DEVICE MANAGEMENT</b>  <b>5.1</b> Input Output System : I/O Hardware & Interface, Kernel I/O Sub System, I/O request streams. <b>5.2</b> Disk Management- Disk Structure, Disk Scheduling and its algorithms, RAID TECHNOLOGY. <b>5.3</b> Case study of UNIX, Linux, Windows Vista & Windows Seven on Device Management.	<b>10</b>
<b>6.</b>	<b>PROTECTION AND SECURITY</b>  <b>6.1</b> Goal of Protection, Domain of Protection, Security Problems Authentication, <b>6.2</b> Case study of UNIX, Linux, Windows Vista & Windows Seven on Protection & Security.	<b>07</b>
<b>7.</b>	<b>Other Operation System</b>  <b>7.1</b> Introduction to Network Operation System (Only Brief Concept). <b>7.2</b> Introduction to Distributed Operation System (Only Brief Concept).	<b>06</b>



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**LIST OF EXPERIMENTS**

Practical: **2 Hrs. per Week**

<b>S.NO.</b>	<b>NAME OF EXPERIMENTS</b>	<b>HOURS OF STUDY</b>
<b>1</b>	<b>1. BIOS Configuration</b> <b>2. Installation of Various Operation System</b> <b>a. Windows Vista</b> <b>b. Windows XP</b> <b>c. Linux</b> <b>d. Unix</b>	<b>10</b>
<b>2</b>	File Management Commands, Use of Administration Commands, System Calls	<b>5</b>
<b>3</b>	Simulation of CPU Scheduling Algorithms (FCFS, SJF)	<b>5</b>
<b>4</b>	Simulation of Paging	<b>5</b>
<b>5</b>	Case study of UNIX, Linux, Windows Vista, Windows Seven & Windows XP.	<b>5</b>
	<b>TOTAL</b>	<b>30</b>



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## REFERENCES

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### TEXT BOOKS

1. Galvin, Operating Systems, Wiley Eastern.
2. Godbole A.S Operating Systems, TMH New Delhi.

### REFERENCE BOOKS

1. Beach M.J., Operating System, PHI
2. Milankovic, Operating Systems, TMH
3. Donovons & Mendric, Operating Systems, TMH.
4. .William stalling Operating System, pearson edu.
5. Operating System Principal and Design by Pabitra Pal Choudhury , PHI



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SEMESTER: THIRD

COURSE CODE: 303

NAME OF COURSE: NETWORKING ESSENTIALS

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

SCHEME: Jul.09

PAPER CODE: 6346

## RATIONALE

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Information and communication are two of the most important strategic issues for the success of every enterprise. While today nearly every organization uses a substantial number of computers and communication tools ( telephones, fax, personal handheld devices), they are often still isolated. While managers today are able to use the newest applications, many departments still do not communicate and much needed information cannot be readily accessed.

To overcome these obstacles in an effective usage of information technology, computer networks are necessary

This subject introduces the students to the world of networking. Before one learns the technology of networking it is essential that the student has thorough understanding of various terminologies and concepts. The student gets introduced to network topologies, architectures, protocols, devices, etc.



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SEMESTER: THIRD

COURSE CODE: 303

NAME OF COURSE: NETWORKING ESSENTIALS

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

SCHEME: Jul.09

PAPER CODE: 6346

## SCHEME OF STUDIES AND SPECIFICATION TABLE

Lectures: 4 Hrs. per week

Practical: 2 Hrs. per week

## SCHEME OF STUDIES

S.No.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS)	TOTAL (HRS)
3.	Introduction	06	04	10
4.	Networking Models	14	06	20
5.	Network Address	12	06	18
6.	Network Operating System(NOS)	10	07	17
7.	Networking Components	18	06	21
	TOTAL	60	30	90



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## COURSE CONTENT

Lectures: 4 Hrs. per week

S.NO.	COURSE CONTENT	HOURS OF STUDY
1	<b>INTRODUCTION :</b>  1.1 Basics of Networks - Definition, Need, Uses and Advantages. 1.2 Types of Computer Networks-Local area Networks (LAN), Wide Area Networks(WAN) , Metropolitin Area Network(MAN). 1.3 Network Architectures- Peer to Peer , Client-Server, Hybrid, Intranet and Internet. 1.4 Different Topologies – Bus, Ring, Star, Hybrid .	06
2	<b>NETWORKING MODELS :</b>  2.1 OSI Reference Model- Introduction to each layer , Its Functionalities , Related Protocols and device name. 2.2 TCP/IP Reference Model- Introduction to each layer , Its Functionalities , Related Protocols and device name. 2.3 comparison Between OSI Vs. TCP/IP reference Model. 2.4 Introduction to various LAN Protocols. 2.5 Introduction to various WAN Protocols.	14



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<b>3</b>	<b>Network Address :</b>  <b>3.1</b> Overview, Type of Addresses : Physical Address and Logical address <b>3.2</b> Physical Address: Need , Advantages And Disadvantages <b>3.3</b> Logical Address : Need , Advantages And Disadvantages <b>3.4</b> IP Addresses : Class Full Addressing Network ID , Host ID Special Addressing <b>3.5</b> Overview Subnetting and Supernetting	<b>10</b>
<b>4</b>	<b>Network Operating System(NOS):</b> <b>4.1</b> Features of NOS : Multiuser , multitasking , time sharing, Distributed Operating System <b>4.2</b> Types of Client / Server Operating System. Open Sources And Windows Operating System	<b>10</b>
<b>5</b>	<b>Networking Components:</b> <b>5.1</b> Networking Media – Coaxial, UTP, Shielded Twisted Pair, Fiber Optical Cable, wireless media. <b>5.2</b> Networking Devices – NIC, Modem , Hub, Repeater, Switches, Bridge, Router, Wi-Fi , VSAT. <b>5.3</b> Structured cabling- Concept, advantages, racks, patch panel, crimping, crimping and punch tool, patch cords, RJ Connectors, Information Outlets (I/O Box) , Media Converter <b>5.4</b> Types of Connectivity – Dial up, Digital Subscriber Link (DSL), Asynchronous Digital Subscriber Link (ADSL) , Leased line /Non Exchange , Cable Net , WI-FI, WI-MAX, CDMA,GSM. <b>5.5</b>	<b>18</b>
<b>TOTAL</b>		<b>60</b>





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NAME OF COURSE: NETWORKING ESSENTIALS

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

**LIST OF EXPERIMENTS**

**Practical: 2 Hrs. per Week**

<b>S.NO.</b>	<b>NAME OF EXPERIMENTS</b>	<b>Hours of Study</b>
1	Observation and Study of Various Network Devices	
2	Observation and Study of Various Type of Network Topologies	
3	Crimping of UTP Cable(cross over, straight ) and Testing of cables.	
4	Observation and Study of ad-hoc networks and Structured networks	
5	Installation of Various types of Network Devices	
6	Implementation of small Network segment	
7	Identifying valid IP Addresses, Defining Subnet IDs and Host IDs.	
8	Design a Small enterprise Network and configure all Network Devices and assign IP Addresses	
	<b>TOTAL</b>	<b>30</b>



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NAME OF COURSE: NETWORKING ESSENTIALS

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

SCHEME: Jul.09

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## **BOOKS RECOMMENDED**

1. **Local Area Networks** by Forouzon – Tata Mcgraw Hills Ltd. India.
2. **Introduction to Networking** by Richard McMohan Publisher Tata Mcgraw Hills Ltd. India.
3. **Network Cabling Handbook** by Chris Clerk Publisher Tata Mcgraw Hills Ltd. India.
4. **ABC'S of Local Area Network** By Michael Dorth, BPB Publications, New Delhi



# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL DIPLOMA IN COMPUTER HARDWARE & MAINTENANCE

SEMESTER: **THIRD**

COURSE CODE: **304**

NAME OF COURSE: **PC Assembly & Maintenance**

COMMON WITH PROGRAM (S): **COMPUTER HARDWARE & MAINTENANCE**

SCHEME: Jul.09

PAPER CODE: 6347

## RATIONALE

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The first task when learning to use a computer is to become familiar with its building Hardware & Software.

“PC Assembly” is the fundamental exposure to basic skill required for all students pursuing their studies in Computer Hardware Diploma discipline.

This subject introduces the student to Computer Basic Hardware & Software Technology. This subject covers different type's motherboards, memory, Operating system, & peripherals .

### **Objective:**

After completion of Syllabus student will be able to

- √ Identify different Motherboards
- √ Identify different types of Cables and Connectors, Power Supply
- √ Identify key integrates like I/O Ports, Memory, & Peripherals
- √ Differentiate between Windows & Linux Operating System
- √ Work on different options in BIOS
- √ Configure various peripherals
- √ Identify & Diagnose various Hardware & Software related Problems



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SEMESTER: THIRD  
COURSE CODE: 304  
NAME OF COURSE: **PC Assembly & Maintenance**

SCHEME: Jul.09  
PAPER CODE: 6347

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

## SCHEME OF STUDIES AND SPECIFICATION TABLE

Lectures: 4 Hrs. per week  
Practical: 2 Hrs. per week

### SCHEME OF STUDIES

S.No.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS)	TOTAL (HRS)
1	BASIC OF COMPUTER ASSEMBLY	10	12	22
2	OPERATING SYSTEM & ITS INSTALLATION	10	12	22
3	CONFIGURE PERIPHERALS AND SOFTWARE INSTALLATION	15	06	21
4	TROUBLESHOOTING	15	00	15
5	SAFETY MEASURES	10	00	10
	TOTAL	60	30	90



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COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

### COURSE CONTENT

Lectures: 4 Hrs. per week

S.NO.	COURSE CONTENT	HOURS OF STUDY
1	<b>BASICS OF COMPUTER ASSEMBLY</b>  1.1 Elements of Computers, 1.2 Various Types of cabinets & SMPS. 1.3 Processors Specifications, 1.4 Types of Motherboard Expansion Slots , add-on cards; 1.5 Types of data cables and power cables , 1.6 Types of connectors, headers I/O Ports:- Serial, Parallel , USB , firewire 1.7 Primary Memory devices:- RAM,ROM,EPROM,EEPROM, 1.8 Secondary memory:- Hard disk Drive, Flash Device, CD/ DVD drive. 1.9 Input devices:- Key Boards, Mouse, Microphone, Web cameras, Scanner & Bar code reader. 1.10 Output devices: Monitor, Printer, Plotter, and Speakers	10
2	<b>OPERATING SYSTEM &amp; ITS INSTALLATION</b>  2.1 Introduction to Basic Input output system (BIOS) 2.2 BIOS configurations: Entering in to the BIOS, Selecting the BOOT devices priority, BIOS Security. 2.3 Types of different file systems for WINDOWS and LINUX. 2.4 Analyze partition requirements for Different applications, Hard disk partitioning. 2.5 Installation of WINDOWS and Linux OS.	10



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3	<p>CONFIGURE PERIPHERALS AND SOFTWARE INSTALLATION</p> <p>3.1 Basics of Control Panel, Device Manager and system services</p> <p>3.2 Configuration of Add on cards. Configuration of VGA, Sound card, LAN card and Modem.</p> <p>3.3 Configuration of peripherals: Printers, Scanners, Web camera.</p> <p>3.4 Installation &amp; Un installation of various Application Software and utilities.</p>	15
4	<p>TROUBLESHOOTING</p> <p>4.1 Power on self test (POST): Identification of error Codes, Hardware failure, operating system failure, device driver error.</p> <p>4.2 Troubleshooting Plug &amp; Play devices.</p> <p>4.3 Serial Port signals, Troubleshooting serial ports,</p> <p>4.4 Troubleshooting video adapter.</p> <p>4.5 Troubleshooting Boot Failures</p> <p>4.6 Installing and Configuring Terminal Services i.e. Remote Desktop Connection</p>	15
5	<p>SAFETY MEASURES</p> <p>a. Types of Backup and its Need,</p> <p>b. Using Backup Utility, Scheduling Backups Restoring Data,</p> <p>c. Automated System Recovery ( ASR)</p> <p>d. Introduction to Computer VIRUS, Malwares, Spammer, antivirus and anti malwares,</p> <p>e. Introduction to Firewall</p>	10
	Total	60



# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

## DIPLOMA IN COMPUTER HARDWARE & MAINTENANCE

SEMESTER: THIRD

COURSE CODE: 304

NAME OF COURSE: **PC Assembly & Maintenance**

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

SCHEME: Jul.09

PAPER CODE: 6347

### LIST OF EXPERIMENTS

Practical: 2 Hrs. per Week

S.NO.	Name of experiments	Hours of Study
1.	Draw Layout & understand internal parts of Computers Desktop & Laptop.	
2.	Identify different types of Processors, Cables, Connectors used in Computer.	
3	Identify different types of Drives & understand internal mechanism of the same (HDD, Optical drive, Zip, Pen, SCSI Drive).	
4.	Installation of SCSI Drive, Optical Drives (CDR, DVRW). Draw layout & understand sections of Motherboards.	
5	Safety measure during P.C. Assembling Plan and assemble a P.C.	
6	Configuring important parameters of CMOS Setup utility, BIOS update.	
7	Installation of Windows OS, Partitioning, Formatting.	
8	Installation of LINUX Operating System. Installation of Add On Cards	
9	Installation of Printers & Cameras	
10	Installation of Application Software	
	<b>TOTAL</b>	<b>30</b>



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## **BOOKS RECOMMENDED.**

1. Peter Norton's: Inside the PC, SAMS Techmedia
2. Winn L. Rosch's: Hardware Bible, SAMS Techmedia
3. Gaig Zacker's: The complete Reference PC Hardware, Tata McGraw Hil
4. Mark Minasi: The Complete PC Upgrade & Maintenance Guide, BPB Publicatlion
5. Scott Mueller: Upgrading & Repairing PCs, Pearson Education





# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL DIPLOMA IN COMPUTER HARDWARE & MAINTENANCE

SEMESTER: THIRD

COURSE CODE: 305

NAME OF COURSE: BASICS OF LINUX

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

SCHEME: Jul.09

PAPER CODE:6348

## RATIONALE

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The objective of the course is to make students aware of a multi-user operating system. This course will serve as a foundation course for the higher level course in LINUX. The students are expected to learn the commands while doing practical and emphasis should be given to those switches/options and flags, which are most frequently used in real life. After completion of the course students will be able to:

- Understand Operating System concepts.
- Use System calls and memory management.
- Use LINUX commands and editors.
- Carry out LINUX File management and shell programming in LINUX.
- Do Network configuration and security management in LINUX.



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## DIPLOMA IN COMPUTER HARDWARE & MAINTENANCE

SEMESTER: THIRD  
COURSE CODE: 305

SCHEME: Jul.09  
PAPER CODE: 6348

NAME OF COURSE: BASICS OF LINUX

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

### SCHEME OF STUDIES AND SPECIFICATION TABLE

Lectures: 5 Hrs. per week

Practical: 2 Hrs. per week

### SCHEME OF STUDIES

S.No.	TOPICS	THEOR Y (HRS.)	PRACTIC AL (HRS)	TOTA L (HRS)
1	Introduction	02	01	
2	Linux Usage and Basics	02	01	
3	Running Commands and Getting Help	05	02	
4	File System, Standard I/O and Pipes	10	02	
5	Managing Users and Groups	06	02	
6	Advance File System	06	02	
7	vim: An Advanced Text Editor	06	02	
8	Shell and Shell Programming	20	14	
9	Text Processing Tools	06	02	
10	Managing Process, X-windows and basic System Configuration tools	12	04	
	<b>TOTAL</b>	<b>75</b>	<b>30</b>	



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NAME OF COURSE: BASICS OF LINUX

COMMON WITH PROGRAM (S): COMPUTER HARDWARE & MAINTENANCE

Lectures: 5 Hrs. per week

S.No.	COURSE CONTENT	Hours of study
1	<b>Introduction</b> <b>1.1 Linux Ideas and History</b> Understanding Open Source, Linux Origins, Distributions, Linux Principles <b>1.2 Linux Usage and Basics</b> Logging in to a Linux System, Switching between virtual consoles and the graphical environment, Elements of the X Window System, Starting the X server, Changing your password, The root user, Changing identities, Editing text files.	03 Hrs.
2	<b>Working with Linux</b> <b>2.1 Running Commands and Getting Help</b> Running Commands, Some Simple commands, Getting Help, The whatis command, The – help Option, Reading Usage Summaries, The man command, Navigating man pages, The info command, Navigating info pages, Extended Documentation. <b>2.2 File System</b> Linux File Hierarchy Concepts, Some Important Directories, Current Working Directory, File and Directory Names, Absolute and Relative Pathnames, Changing Directories, Listing Directory Contents, Copying, Moving, Renaming, Creating and Removing Files & Directories, Using Nautilus, Determining File Content.	05 Hrs.



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	<p><b>2.3 Standard I/O and Pipes</b> Standard Input and Output, Redirecting Output to a File, Redirecting STDOUT to a Program(Piping), Combining Output and Errors, Redirecting to Multiple Targets (tee), Redirecting STDIN from a file, Sending Multiple Lines to STDIN.</p> <p><b>2.4 Users, Groups and Permissions</b> Users, Groups, Linux File Security, Permission Precedence, Types, Examining Interpreting, Changing File Ownership, Changing Permissions – Symbolic Method, Numeric Method &amp; Nautilus</p> <p><b>2.5 Advanced Topics in Users, Groups and Permissions</b> User and Group ID Numbers, /etc/passwd, /etc/shadow and /etc/group files, User Management tools, System Users and Groups, Monitoring Logins, Default Permissions, Special Permissions for Executables &amp; Directories</p>	
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<b>3</b>	<b>Advance File System</b> <b>3.1 The Linux File System In-depth</b> Partitions and File system, Inodes, Directories, Hard Links, Symbolic ( or soft) Links, The Seven Fundamental Filetypes, Checking Free Space, mounting & unmounting File system , working with etc/fstabe, Archiving Files, Compressing, Creating, Listing and Extracting File, Other Archiving Tools. <b>3.2 Finding and Processing Files</b> Locate, find and its operator, Executing commands with find, The GNOME Search Tool. <b>vim: An Advanced Text Editor</b> vim: vim basics, Opening, Modifying, Saving and exiting vim, Using Command Mode, Search and Replace Manipulating Text, Undoing changes, Using multiple “windows”, Configuring vi and vim.	<b>06 Hrs.</b>
<b>4</b>	<b>Shell and Shell Programming</b> <b>Using the Bash Shell</b> Introduction of Bash shell, Bash Features, Command Line, Command Line Expansion, and Editing, gnome-terminal. <b>Configuring the Bash Shell</b> Bash Variables, Environment variables, The TERM Environment variable, The PATH Environment variable, Some common variables, Aliases, How bash expands a Command Line, Preventing Expansion, Login vs non-login shells, Bash startup tasks: profile, Bash startup tasks: bashrc, Bash exit tasks <b>Shell Programming</b> Scripting Basics, Creating Shell Scripts, Handling Input/ Output, Control Structures, Conditional Execution, File and string Tests, continue and break, Using positional parameters, Scripting at the command line, Shell Script debugging.	<b>20hrs</b>



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<b>5</b>	<b>Text Processing Tools</b> Tools for Extracting Text, Viewing File Contents, Viewing File Excerpts, Extracting Text by Keyword, Extracting Text by column, Tools for analyzing text, Gathering text statistics, Sorting Text, Eliminating Duplicate Lines, Comparing Files, Duplicating File Changes, Spell Checking with aspell, Tools for manipulating Text, sed, Special Characters for Complex Searches. <b>Investigating and Managing Process</b> What is a Process? Listing Processes, Finding Processes, Signals, Sending Signals to Processes, Scheduling Priority, Altering Scheduling Priority, Interactive Process management tools, Job Control, Scheduling a Process to execute later, Crontab File format. Different run levels	<b>06hrs</b>
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SCHEME: Jul.09

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## LIST OF EXPERIMENTS

Practical: 2 Hrs. per Week

S.NO.	Name of experiments	Hours of Study
1.	<b>Files and Directories</b> Cat, cd, chgrp, chmod, cp, file, find, grep, head, just, lpq, lpr , lprm, cancel, ls, mkdir, more, page, mv, pwd, rm, rmdir, tail, touch,	
2.	The mtools commands are for accessing MSDOS disks. mcopy, mdir, mcd, mdel.	
3	<b>File Editors</b> Editors are used to create and amend files.	
4.	Emacs, ex, edit, gedit, nedit, xemacs, emacs, dtpad, pico, vi, <b>Manipulating data</b> The contents of files can be compared and altered with the following commands.	
5.	Awk, cmp, comm, cut, diff, expand, unexpand, gawk, Join, look, perl, paste, sed, sort, split, tr, uniq, wc,	
6.	<b>Compressed files</b> Files may be compressed to save space. Compressed files can be created and examined. Compress, uncompress, zcat, zcmp, zdiff, zmore, gzip, gunzip.	
7.	<b>Information</b> Manuals and documentation are available on-line. The following Shell commands give information. answerbook2, apropos, dthelpview, man, info, help. <b>Printing</b> Files can be printed using shell commands, using the GUI print manager, or direct from some applications.	
8.	lpr -Pprinter, a2ps -Pprinter, dvips -Pprinter,	



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9	<b>Messages between Users</b> The UNIX systems support on-screen messages to other users and world-wide electronic mail, pine, elm, dtmail, frm, from, dtmail, mesg, parcel, talk, write	
10	<b>Networking</b> Setup a small network in your lab and connect to that network Internet Protocol Service. These commands are used to send and receive files from Campus UNIX hosts and from other hosts and the Internet around the world. ftp - file transfer program, rcp - remote file copy, rlogin - remote login to a UNIX host, rsh - remote shell, tftp - trivial file transfer program, telnet - make terminal connection to another host, ssh - secure shell terminal or command connection, scp - secure shell remote file copy, sftp - secure shell file transfer program, netscape - web browser	
	<b>TOTAL</b>	<b>30</b>





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## BOOKS RECOMMENDED.

### MAIN READING

1. Sumitabha Das, UNIX/LINUX: Concepts and Applications, Tata McGraw-Hill, 2008.
2. ISRD Group, Basics of OS, UNIX and SHELL Programming, Tata McGraw-Hill, 2006.
3. Stephen Prata Advanced UNIX -A programmer's Guide, BPB Publication, 2008.

### REFERANCES

1. Kochan S & Wood P, UNIX Shell Programming, Pearson Education, 2008.
2. Sarwar, Koretsky, and Sarwar, UNIX, the Text Book, Pearson Education, 2007.
3. Stevens W R, Rago S.A, Advanced Programming in UNIX Environment, Pearson Education, 2008.
4. Maurice J. Bach, Design of the UNIX Operating System, Pearson Education, 2008.

### WEB REFRERANCES:

<http://www.linux-tutorial.info/index.php>

<http://www.ee.surrey.ac.uk/Teaching/Unix/>

<http://www.aboutdebian.com/>

[www.developertutorials.com/tutorials/linux/](http://www.developertutorials.com/tutorials/linux/)

[www.yolinux.com/TUTORIALS/](http://www.yolinux.com/TUTORIALS/)

[www.linuxquestions.org/](http://www.linuxquestions.org/)

[http://bash.cyberciti.biz/guide/Main\\_Page](http://bash.cyberciti.biz/guide/Main_Page)

<http://stommel.tamu.edu/~baum/programming.html>

<http://williamstallings.com/>