



# RANI DURGAVATI VISWAVIDYALAYA, JABALPUR

## Post Graduate Diploma in Cyber Forensics and Information Security (PGDCS)

### Scheme of Examination as per credit system

PGDCS First Semester										
Course code	Subject	Periods per Week			Credits	Maximum Marks Theory Slot		Maximum Marks Practical Slot		Total Marks
		L	T	P		End Sem. Exam	Tests (Two)/as signment	End Sem. Practical performance/ viva	Practical Record/Pr esentation/ viva	
DCC101	Microprocessor architecture & assembly language Programming	4	-	-	4	60	40	-	-	100
DCC102	Operating Systems Design Principles	4	-	-	4	60	40	-	-	100
DCC103	Computer Networks	4	-	-	4	60	40	-	-	100
DCC104	Fundamentals of Information Security	4	-	-	4	60	40	-	-	100
DCC105	Lab: based on paper 1 & 4	-	-	4	2	-	-	60	40	100
DCV106	Comprehensive Viva-Voce	-	-	-	4 *(Virtual)	-	-	-	-	100
	<b>TOTAL</b>	<b>16</b>	<b>-</b>	<b>04</b>	<b>22</b>					<b>600</b>

## PGDCS Second Semester

Course code	Subject	Periods per Week			Credits	Maximum Marks Theory Slot		Maximum Marks Practical Slot		Total Marks
		L	T	P		End Sem. Exam	Tests (Two)/assignment	End Sem. Practical performance/viva	Practical Record/Presentation/	
DCC201	Linux Administration	4	-	-	4	60	40	-	-	100
DCC202	E-Commerce Security	4	-	-	4	60	40	-	-	100
DCC203	Computer Forensic Analysis and Investigation	4	-	-	4	60	40	-	-	100
DCC204	Cyber Laws & Information Security	4	-	-	4	60	40	-	-	100
DCC205	Lab: On the basis of paper-1 & paper-3	-	-	4	2	-	-	60	40	100
DCC206	Project Work	-	-	-	4			60	40	100
DCV207	Comprehensive Viva-Voce	-	-	-	4 *(Virtual)	-	-	-	-	100
	<b>TOTAL</b>	<b>16</b>	<b>-</b>	<b>04</b>	<b>26</b>					<b>700</b>

# **DCC101: MICROPROCESSOR ARCHITECTURE & ASSEMBLY LANGUAGE PROGRAMMING**

**Max Marks:60  
(Min. Passing Marks :21)**

## **UNIT-I**

Microprocessors, Microcomputers, and Assembly Language, The 8085 Programming Model, Instruction, Data Format, and Storage, 8085 Microprocessor Architecture and its operation, Microprocessor initiated operation, Bus organization of 8085, Registers, Memory unit of 8085, Instruction decoding & execution, 8085-Based single board Microcomputer, Pin out Diagram of 8085, Bus timings, ALU of 8085 and its flags.

## **UNIT-II**

Instruction set of 8085, Classification of Instructions, Addressing Modes, Data transfer operation commands, Arithmetic operation commands, Logic operation commands, Branch operation commands, Writing and debugging simple assembly Language Program, developing assembly Language Program, Writing programs using an assembler, Branching looping and Indexing. Programming Techniques, Looping, Counting and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Operations Related to Memory, Logic Operations: Rotate, Logic Operations: Compare, Dynamic Debugging

## **UNIT-III**

Counters and Time Delays, Stack, Subroutine, Restart, Conditional Call, and Return Instructions, Advanced instructions - LHLD, SHLD, XCHG, PUSH, POP, XTHL, PCHL, Assembly Programs of addition, subtraction, multiplication and division of multi byte signed and unsigned numbers, Interrupts, Microprocessor-Based Software Development Systems, Operating Systems and Programming Tools, Assemblers and Cross-Assemblers, Writing Programs Using a Cross- Assembler.

## **UNIT – IV**

I/O device, Interfacing devices, I/O ports, 8255 programmable peripherals interfacing, Basic Interfacing concepts, Interfacing output display, Interfacing input key board, Memory mapped I/O, I/O mapped I/O, Data Transfer (synchronize and asynchronies), 8085 Interrupts (Hardware and Software), 8085 Vectored Interrupts,

## UNIT-V

Basic Concepts in Programmable Devices, 8253 programmable interfacing timer, DMA (Direct memory Access), DMA Controller, Extending 8-Bit Microprocessor Concepts to Higher Level Processors and Microcontrollers, 16-Bit Microprocessors, BASICS OF 8086, High-End-High-Performance Processors, Single-Chip Microcontrollers

### **TEXT & REFERENCE BOOKS :**

- MICROPROCESSOR ARCHITECTURE, PROGRAMMING & APPLICATIONS WITH 8085  
RAMESH GAONKAR, PENRAM PUBLISHING LTD.
- MICROPROCESSORS AND INTERFACING BY D.V. HALL TMH, 2ND EDITION.
- IBM PC ASSEMBLY LANGUAGE PROGRAMMING BY PETER ABLE, PHI
- FUNDAMENTALS OF MICROPROCESSORS AND MICROCOMPUTERS BY B. RAM,  
DHANPAT RAI PUBLICATIONS. 5<sup>TH</sup> EDN

## **DCC102: OPERATING SYSTEM DESIGN PRINCIPLES**

**Max Marks:60**  
**(Min. Passing Marks :21)**

### **UNIT– I**

Definitions, Components and types of Operating system, Operating System Services, System Calls, System Programs, System Structure, System Design and Implementation, System Generations. I/O subsystem Overview, I/O hardware, Application I/O interface, Kernel I/O Subsystem.

### **UNIT–II**

Process Concepts, Process State & Process Control Block, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Threads Introduction

### **UNIT–III**

The Critical Sections Problem, Semaphores, Classical Problem of Synchronization, Deadlock Characterizations, Method for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock.

### **UNIT–IV**

Storage management Logical Versus Physical Address Space, Swapping, Contiguous Allocating, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Thrashing, Demand Segmentation.

### **UNIT–V**

Disk Scheduling, Disk Management, Swap Space Management, Disk Reliability, Stable Storage Implementation, File Concepts, Directory Structure, Protecting, File system in Linux & Windows NT

### **TEXT & REFERENCE BOOKS :**

- OPERATING SYSTEM CONCEPTS By SILBERSCHATZ & GALVIN, ADDISON WESLEY PUBLICATION 6<sup>th</sup> Edition.
- OPERATING SYSTEM CONCEPTS & DESIGN By MILAN MILEN KOVIC, TMH PUBLICATION
- OPERATING SYSTEMS By WILLIAM STALLINGS

## **DCC103: COMPUTER NETWORKS**

**Max Marks:60**  
**(Min. Passing Marks :21)**

### **UNIT-I**

Use of communication and IT , Communication Mode- Simplex, Half Duplex, Full Duplex, Communication Channels - Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication, Types of Network - LAN, WAN, MAN ,Internet etc., Topologies of LAN - Ring, Bus, Star, Mesh and Tree topologies, World Wide Web Internet Services, Analog & Digital Signal.

### **UNIT-II**

Base Band, Broad Band, Multiplexer FDM, TDM, Modulation AM, FM, PM, Transmission Media ,Modem. OSI Reference Model , Switching Technique, Message Switching, Circuit Switching, Packet Switching, Virtual Circuit, , IEEE Standards, 802.3, 802.4, 802.5.

### **UNIT-III**

Fast Ethernet, FDDI Token Ring, Wireless LAN, Inter-Networking Devices, Bridge, Routers Gateways, Repeater, Routing Algorithms, Distance Vector Routing, Shortest Path Routing, Broadcast Routing, Multicast Routing, TCP/IP Protocol, IPV4 Addressing, Congestion Control, Traffic Shaping.

### **UNIT-IV**

Comparison Between OSI and TCP/IP Models, TELNET, FTP, SMTP, MIME, UDP, URL (Uniform Resource Locator) HTTP , ISDN Channel, ISDN Services, Base Band ISDN, Broadband ISDN.

### **UNIT-V**

Network Security : Network Security Issues, Firewalls – Need and Features of Firewalls, Types of Firewall Technology- Network Level and Application Level, IP Packets Filter Screening Routers, Limitations of Firewalls.

### **TEXT & REFERENCE BOOKS :**

- COMPUTER NETWORKING BY ANDREWS TANANBAUM
- UNDERSTANDING DATA COMMUNICATION OF NETWORKING BY WILLIAM A SHAY
- COMMUNICATION AND NETWORK BY LEWIS MACHENZIE
- DATA COMMUNICATION BY PRAKASH C GPTA
- DATA AND COMPUTER COMMUNICATION: BY WILLIAM STALLINGS

## **DCC104: FUNDAMENTALS OF INFORMATION SECURITY**

**Max Marks:60**  
**(Min. Passing Marks :21)**

### **UNIT-I**

Basics of Communication Systems- Computer Networks types, Transmission Media, Network Topology, Network Protocols, ISO/OSI and TCP/IP Protocol Stacks, Local Area Networks, Wide Area Networks, Internetworking, LAN, WAN and Wireless Networks , The Internet.

### **UNIT-II**

What is Network Security, Security Services, Security Standards, Elements of Security, Security Threats to Computer Networks, Sources of Security Threats, Security Threat Motives, Security Threat Management, Computer Network Vulnerabilities, Sources of Vulnerabilities, Vulnerability assessment, Computer Viruses, Types of viruses, prevention and protection mechanisms-scanning, filtering and blocking, Virus filtering, Contents filtering, Spam,

### **UNIT-III**

Cyber Crimes and hackers, Dealing with Cyber crimes, Hostile scripts, Security Assessment, Analysis and Assurance, Security Requirements Specifications, Threat Identification, Threat Analysis, Vulnerability Identification and Assessment, Security Certification, Security Monitoring and Auditing, Products and Services.

### **UNIT-IV**

Security Access Control and Authorization—Access Rights, Access Control Systems, Authorization, Types of authorization Systems, Authorization principles, Authorization granularity, web access and authorization, Authentication –Authentication elements, Types of authentication, Authentication methods.

### **UNIT-V**

Cryptography, Definition, Symmetric encryption, Public key encryption, Key Management: Generation, Transportation and Distribution, Public Key Infrastructure, Firewalls, Types of Firewalls, Improving Security through Firewalls.

### **TEXT & REFERENCE BOOKS :**

- **Computer Network Security**, by **Joseph M. Kizza**, **Publisher:** Springer International Edition. 2007
- **Computer Security**, 2<sup>nd</sup>. ed. by Dieter Gollmann **Publisher:** John Wiley & Sons, 2006 ISBN: 0-470-86293-9
- **Security in Computing**, **Fourth Edition Author:** Charles P. Pfleeger , Shari Lawrence **Publisher: Pearson India**
- **Cryptography and Network Security** Principles and Practices 3<sup>rd</sup>. ed. by William Stallings **Publisher:** Pearson Education

# **DCC201: LINUX ADMINISTRATION**

**Max Marks: 60**  
**(Min. Passing Marks: 21)**

## **UNIT-I**

Introduction: Introduction to UNIX, Linux, GNU and Linux distributions Duties of the System Administrator, The Linux System Administrator, Installing and Configuring Servers, Installing and Configuring Application Software, Creating and Maintaining User Accounts, Backing Up and Restoring Files, Monitoring and Tuning Performance, Configuring a Secure System, Using Tools to Monitor Security , Booting and shutting down: Boot loaders-GRUB, LILO, Bootstrapping, Init process, rc scripts, Enabling and disabling services. The File System: Understanding the File System Structure, Working with Linux- Supported File Systems, Memory and Virtual File Systems, Linux Disk Management, Network Configuration Files

## **UNIT-II**

System Configuration Files: System wide Shell Configuration Scripts, System Environmental Settings, Network Configuration Files, Managing the init Scripts, Configuration Tool, Editing Your Network Configuration TCP/IP Networking: Understanding Network Classes, Setting Up a Network Interface Card (NIC), Understanding Subnetting, Working with Gateways and Routers, Configuring Dynamic Host Configuration Protocol, Configuring the Network Using the Network The Network File System: NFS Overview, Planning an NFS Installation, Configuring an NFS Server, Configuring an NFS Client, Using Automount Services, Examining NFS Security

## **UNIT-III**

Connecting to Microsoft Networks: Installing Samba, Configuring the Samba Server, Creating Samba Users 3, Starting the Samba Server, Connecting to a Samba Client, Connecting from a Windows PC to the Samba Server Additional Network Services: Configuring a Time Server, Providing a Caching Proxy Server Internet Services: Secure Services, SSH, scp, sftp Less Secure Services (Telnet ,FTP, sync, rsh ,rlogin, finger, talk and ntalk, Linux Machine as a Server, Configuring the xinetd Server, Comparing xinetd and Standalone, Configuring Linux Firewall Packages, Domain Name System: Understanding DNS, Understanding Types of Domain Servers, Examining Server Configuration Files, Configuring a Caching DNS Server, Configuring a Secondary Master DNS Server, Configuring a Primary Master Server, Checking Configuration

## **UNIT-IV**

Configuring Mail Services: Tracing the Email Delivery Process, Mail User Agent (MUA), Introducing SMTP, Configuring Sendmail, Using the Postfix Mail Server, Serving Email with POP3 and IMAP, Maintaining Email Security Configuring FTP Services: Introducing vsftpd, Configuring vsftpd, Advanced FTP Server Configuration, Using SFTP

## **UNIT-V**

Configuring a Web Server: Introducing Apache, Configuring Apache, Implementing SSI, Enabling CGI, Enabling PHP, Creating a Secure Server with SSL System Administration: Administering Users and Groups Installing and Upgrading Software Packages

### **TEXT & REFERENCE BOOKS :**

1. Red hat Linux Networking and System Administration, 3rd Edition by Terry Collings and Kurt Wall, Wiley Publishing
2. Sumitabh Das, Mc. Graw Hill



## **DCC202: E-COMMERCE SECURITY**

**Max Marks:60**  
**(Min. Passing Marks :21)**

### **UNIT- I**

Introduction to E-commerce: Operating System Services, Advantages and Disadvantages of E – Commerce, Developer Services, Data Services, Application Services, Store Services, Client Services, Types of E-Commerce Solutions- Direct Marketing and Selling, Supply Chain Integration, Corporate Procurement.

### **UNIT- II**

Business Models for E-Commerce: E-Business models based on Relationship of Transaction Parties, Brokerage Model, Aggregator Model, Info-mediary model, Community Model, Value chain model, Manufacturer model, Advertising Model, Subscription model, E- Marketing – Identifying Web Presence Goals, Browsing Behaviour Model, Building Customer Relationship Based on One – to – One Marketing, E – branding, Elements of Branding, Spiral Branding.

### **UNIT- III**

Electronic Data Interchange: Evolution, uses, Benefits, Working of EDI,EDI Standards(includes variable length EDI standards),Cost Benefit Analysis of EDI, Electronic Trading Networks, EDI Components, File Types, EDI Services, EDI Software, Business Approach of EDI, EDIFACT( Overview, Structure, EDIFACTSoftware), Business Future of EDI,EDI Administration.EDI Security, Digital signatures, Digital Certificates, Cryptography export restrictions, Secure Sockets Layer(SSL), Secure Electronic Transactions(SET),Smart Cards and its applications, WAP, WAP Architecture, WAP Programming Model.

### **UNIT- IV**

Electronic Payment Security: Electronic Payment Systems – Electronic Commerce, Offline Versus Online, Debit Versus Credit, Macro versus Micro, Payment Instrument, Electronic Wallet, Smart Cards, Electronic Payment Security. Payment Security Services – Payment Transaction Security, Digital Money Security, Electronic Check Security, Availability and Reliability, Electronic Payment Framework.

### **UNIT -V**

Security on the Web & Mobile : Network and Website Security Risks, HTTP Cache Security Issues, HTTP Client Authentication, Web Transaction Security, Web Server Security, Web Client Security, Mobile Agent Security – mobile Agents, Security Issues, Protecting Platforms from Hostile Agents, Smart Card Security, Firewall Concept, Firewall Components, Benefits of an Internet Firewall, Enterprise-Wide Security Framework, Secure Physical Infrastructure.

### **TEXT & REFERENCE BOOKS :**

- E-Commerce: Fundamentals and Applications, Henry Chan, Wiley India
- E-Commerce An Indian Perspective, P. T. Joseph, S.J., PHI.
- Electronic Commerce: Greenstein, Merylin, Tata Mc.Graw Hill.
- E-Commerce Business. Technology. Society, Kenneth C. Laudon, Carol Guerico Traver, Pearson

## **DCC203: COMPUTER FORENSICS ANALYSIS AND INVESTIGATIONS**

**Max Marks:60**  
**(Min. Passing Marks :21)**

### **UNIT-I**

Determining what data to collect and analyze. Addressing data hiding techniques, Hiding partitions, Marking bad cluster, Bit –shifting, using steganography to hide data, Examining encrypted files, Recovering Passwords, Performing Remote Acquisitions, Remote Acquisitions with Runtime Software.

### **UNIT-II**

Understanding vector Graphics, Understanding graphics file formats .Lossless and lossy compression. Identifying graphics file fragments, Repairing Damaged Headers, Searching for and carving data from unallocated space. Understanding steganography in graphics files. Using steganalysis tools. Understanding copyright issues with graphics.

### **UNIT-III**

Performing live acquisitions, Performing a live acquisition in windows, Developing standard procedures for network forensics, Reviewing network logs. Using network tools, using Unix/Linux tools. Using packet sniffers, examining the honey net projects.

### **UNIT-IV**

Exploring the role of email investigation, Exploring the role of client and server in email, Investigating E-mail crimes and violations, Examining E-mail Messages, Viewing E-mail headers, Examining E-mail headers, Examining additional E-mail files. Tracing an e-mail message, Using network E-mail logs, Understanding E-mail servers, Examining Unix e-mail server logs, Examining Microsoft email server logs.

### **UNIT-IV**

Understanding mobile device forensics, Mobile phone basics, inside mobile devices, inside PDAs, Understanding acquisition procedures for cell phones and mobile devices, Mobile forensics equipment.

### **TEXT & REFERENCE BOOKS :**

1. Bill Nelson, Amelia Phillips, Christopher Steuart, "Guide to Computer Forensics and Investigations", Fourth Edition, Course Technology.
2. Angus M. Marshall, "Digital forensics: Digital evidence in criminal investigation", John – Wiley and Sons, 2008.

## **DCC204 – CYBER LAWS AND INFORMATION SECURITY**

**Max Marks:60**  
**(Min. Passing Marks :21)**

### **UNIT-I**

**Cyber Law:** Fundamentals of Cyber Law, History of Internet, Introduction to Indian Cyber Law, Need for Cyber Laws, Jurisprudence of Cyber Law, Objective and Scope of the IT Act2000, Uncitral Model Law, Intellectual property issues , Overview of Intellectual property related legislation in India Rationale behind Intellectual Property, Underlying premises of IP, Balancing the Rights of the Owner of the IP and the Society , Enforcement of IPRS, IP and Constitution of India Patent, The Patent System, Patentable Invention?, Non-patentable, Procedure for Obtaining Patent, Copyright, Trademark law, Law related to semiconductor layout and design.

### **UNIT-II**

**Security in E-Commerce:** E-Commerce Issues of privacy, Security Threats to E – Commerce, Physical Security: Incidents of Physical Security Violations, Disaster and Controls, Basic Tenets of Physical Security, Challenges in Ensuring Physical Security, Physical Entry Controls, Steps to Perform after Physical Security Breach; Spyware Technology: Lock Down USB Ports, Device Lock, Tracking Device; Access Control: Biometrics, Benefits, Criteria for selection of Biometrics, Interoperability Issues, Economic and Social Aspects, Legal Challenges; Digital Signatures: Requirements of Digital Signature System, Components of Digital Signature, Technical issues, Legal issues, Electronic Records, Digital Certificates, Applications of Digital Signatures; Certificate Issuance, Cardholder Certificates, Trader Certificates, Acquirer and Issuer Certificates

### **UNIT-III**

**Investigation and Ethics:** Cyber crime, Cyber resource Theft, types of cyber crimes/frauds, cyber frauds in India, Cyber jurisdiction, dealing with cyber crimes in various countries, Ethical issues in data and software privacy, Plagiarism, pornography, Tampering computer documents/system hacking, Data privacy and protection, software piracy, social engineering and Phishing, Types of social engineering, exploring methods of phishing; Issues in ethical hacking, Internet security threats: Hacking and Cracking, Malicious code, Viruses, Worms, Trojan Horses; certifying authorities need and power, appointment function, generation, suspension and revocation of certifying authorities; cyber crime forensic.

### **UNIT-IV**

**Information Security:** Information system, Information Systems, Computer Literacy and IS Literacy, IS Components, Trends in IS, Classification of IS Framework of IS in an Organization, IS and Business Organisation, Human Body as an Information System, IS Failures and Causes , Developing Information System, introduction to various models, Role of security in internet and web services, securing web services, principles of information security, ISMS and its benefits, classification of Threats and attacks,, Security Implication for

organizations, Information classification and their roles, access control, authentication of hosts, vulnerability, stages of vulnerability management.

### **UNIT-V**

**Cryptography:** Understanding Cryptography and Encryption, Private Key Encryption, Public Key Encryption, Secret-Key Encryption, Understanding Cryptographic Algorithms: MD5, SHA, RC4, RC5, Blowfish, Understanding Cryptanalysis, Describing Code Breaking Methodologies, Describing Cryptographic Attacks, Firewalls Types of Firewall Techniques, How to Identify a Firewall, Issues in Documents Security, Basic concepts of Network Security, Sniffing, Sniffing Objectives, Protecting from Sniffing Attacks, Perimeters of Network protection and Network attack, Scoping an Attack, Enumerating Network, Querying Registrar, Querying Domain, Querying Network, Interrogating DNS, Exploring Network Reconnaissance, Common Attacks: Wiretaps, Eavesdropping, Portscan, Need of Intrusion Monitoring and Detection Network-based IDS Host-based IDS, Honeypot Types and Placement, VPN: Insecure Storage of Authentication Credentials by VPN Clients, VPN Fingerprinting, Username Enumeration Vulnerabilities, Offline Password Cracking, Lack of Account Lockout, Denial of Service Attacks, Benefits, Use of Tunnelling with VPN, Authentication Mechanism, Types of VPN, Security Concerns in VPN.

### **TEXT & REFERENCE BOOKS :**

- Cyber law and information security by Faiyaz Ahamed, Dreamtech Publication.
- Information Security and Cyber laws by Saurabh Sharma, Vikas Publishing House Pvt Ltd.
- Information Security and Cyber laws by Pankaj Sharma, S.K. Kataria and Sons

### **REFERENCES:**

- The Indian Cyber law with Cyber glossary, Suresh T. Vishwanathan, New Delhi, Bhart Law House, 2000.
- Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley India
- Law of Cyber Crimes and Information Technology Law, S.V. Joga Rao, 2007.
- Cyber Law, Cyber Crime Internet and E-Commerce, Vimlendu Tayal.
- Information Technology Law and Practice, Vakul Sharma.