

DETAILED SYLLABUS
OF
PG DIPLOMA IN CYBER SECURITY
ONE YEAR DIPLOMA (PGDCS)
EVENING COURSE ON CYBER SECURITY
(EFFECTIVE FROM 2019)



Eligibility Criteria: BCA/BSC (CS)/MSC (CS)/MSC (IT)/BE (CS)/BE (IT)/BSC(IT)/PGDCA
OR Any Graduate with Computer Diploma

**MAKHANLAL CHATURVEDI NATIONAL UNIVERSITY
OF JOURNALISM AND COMMUNICATIONS**
B-38, PRESS COMPLEX, M.P. NAGAR ZONE-I, BHOPAL-462011

(प्रदीप डहेरिया)
सह प्रभारी

सांध्यकालीन पाठ्यक्रम विभाग
माखनलाल चतुर्वेदी राष्ट्रीय पत्रकारिता
एवं संचार विश्वविद्यालय, भोपाल (म.प्र.)

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कक्षा, परीक्षा, प्रश्नपत्र, उत्तरपत्र, कक्षा, परीक्षा, प्रश्नपत्र, उत्तरपत्र


PG DIPLOMA IN CYBER SECURITY (PGDCS) : COURSE STRUCTURE

Subject Code	Subject Name	L	T	P	C	Theory Marks	Internal Marks	Practical Marks	Total Marks
1PGDCS1	Fundamentals of Cyber Security	2	0	0	2	80	20	-	100
1PGDCS2	Ethical Hacking	2	0	0	2	80	20	-	100
1PGDCS3	Social Media and Security	2	0	0	2	80	20	-	100
1PGDCS4	Security Lab -I	0	0	6	3	--	20	80	100
	Total Hours, Credits and Marks	6		6	9				400

Subject Code	Subject Name	L	T	P	C	Theory Marks	Internal Marks	Practical Marks	Total Marks
2PGDCS1	Information and Network Security	2	0	0	2	80	20	-	100
2PGDCS2	Digital Forensics	2	0	0	2	80	20	-	100
2PGDCS3	Server Hardening	2	0	0	2	80	20	-	100
2PGDCS4	Security Lab -II	0	0	6	3	-	20	80	100
	Total Hours, Credits and Marks	6		6	9				400

*L-Lecture Hours/week, T- Tutorial Hours/week, P-Practical Hours/week, C-Credits

For passing the subject examination minimum 40% marks must be separately scored in Theory Paper Practical Exams and Internal Evaluation in the subject.


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First Semester

IPGDCSI- FUNDAMENTALS OF CYBER SECURITY

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	0	2	80	--	20	100

UNIT-I

Computer Generation, Block Diagram, Input/output Units, Input Devices, Output Devices, CPU, Memory, HDD, FDD, and other Storage Devices, Printer Types, Scanner, Networking Concepts. LAN, WAN, MAN, HUB, Cables, Topology, Switch, Gateways, Router, DNS, IP address, Subnet, Windows Basics, Making Folders, Files, Copy, Paste, Typing in MS-words, Excel, Making Presentation in PowerPoint, IP Configuring, Software Installation, Games, Windows Control Panel, Printer Installation, Partition, HDD Geometry, FAT32, NTFS File system, Elementary Number Theory, Required LAB.

Goals: To learn about the basics of computer devices, networking devices.

UNIT- II

Protocols TCP/IP, Ethernet, OSI, Token Ring, Token Bus, FDDI, Application Layer Protocols, Email, SMTP, FTP, HTTP, HTTPS, UDP, and all Cable Crimping, Subnetting, Supernetting, VLSM, Routing, Switching, VLAN, Modem ACL, SNAT, DNAT, Required LAB.

Goals: What is IP Addressing, How Internet works, how data travel within a network.

UNIT- III

Software Firewalls, Hardware Firewalls, Physical and Virtual Machines, KVM, Virtual Box, VMware, Virtualization, AWS, Required LAB.

Goals: Learn about the Network security i.e. Firewall, What is virtual machines & cloud computing and how it works.

UNIT- IV Linux Essentials: Basic commands, Shell, Directory Structure, Users, Groups, Permissions, Partitions. Goals: Journey of Linux operating system, familiarization with Linux and working with Linux command line.

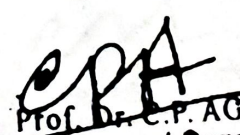
UNIT- V

Servers, DNS, FTP, DHCP, SAMBA, Apache, Active Directory, LDAP, Postfix.

Goals: Working with Different Servers like File, Web, Mail, Centralized Users Servers

Reference Books

1. William Stallings-Cryptography and Network Security: Principles and Practice-Pearson Publication
2. Chris McNab -Network Security Assessment- O'reilly Publication 3rd edition
3. Michael Speciner and Radia Perlman-Network Security: Private Communication in a Public World -Pearson Publication
4. Chey Cobb- Network Security for Dummies
5. Charles P Pfleeger -Security in Computing -Pearson Publication
6. Justin Seitz Black Hat Python-Python Programming for Hackers and Pentesters -William Pollock Publication


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1PGDCS2- ETHICAL HACKING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	0	2	80	--	20	100

UNIT-I

Cyber Law: Cyber Laws in India, Ongoing Efforts in India, Stakeholder Agencies in India. Intergovernmental Organizations and Initiatives

Goals: The Information Technology Act, 2000. It is the Primary Law in India Dealing with Cybercrime and Electronic Commerce.

UNIT-II

Scripting: Linux Shell, And Python: Basics of Scripting, Performing Series of Operations using Scripts.

Goals: To understand Scripts for Automated Attacks.

UNIT-III

Ethical Hacking Overview, Gathering Facts, CP/IP Concepts Review, Network and Computer Attacks, Network Enumeration and Foot Printing- DNS Query, WHOIS Query, OS Finger Printing, Banner Grabbing

Programming for Security Professionals- Web Application Vulnerabilities, Buffer Overflow Attack, Session Hijacking, Code Injection Attacks- Cross Site Scripting Attack, SQL Injection Attack. Required LAB

Goals: Basics of Ethical Hacking, Gathering information required in Order To Attack a Target, Finding Critical Bugs in Servers.

UNIT-IV

Password Hacking, Windows Hacking, Logging by Pass, Network Hacking, and Anonymity and Email Hacking. Web Servers Hacking, Session Hijacking, Surveillance, Desktop and Server OS Vulnerabilities, Required LAB

Goals: Methods of Password Encryption and Decryption, Learn to Remain Anonymous Over the Internet.

UNIT-V

Database Attacks, Hacking Wireless Networks, Cryptography, Network Protection Systems, Trojan and Backdoor Applications, Legal Resources, Virtualization and Ethical Hacking. Required LAB

Goals: Ways to Maintain Access to a System using Trojan and Backdoor. Attacking Database Server and Wireless Networks.

References Books

1. Michael T. Simpson, Kent Backman, James Corley-Ethical Hacking and Network Defense.
2. Stuart McClure Joel Scarnbray, George Kurtz -Hacking Exposed—Network Security Secrets & Solutions,

1PGDCS3- SOCIAL MEDIA AND SECURITY

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	0	2	80	--	20	100

Unit-I

Digital Marketing overview- What is digital marketing? , Traditional marketing vs. digital marketing, Understanding Traffic, Categorization of digital marketing for the business. Search Engine Optimization (SEO)- On page optimization, Off page optimization.

Goals: learn how to use dozens of proven digital marketing strategies.

Unit-II

Social media overview- Social Media Features, Social Media Tools and Platforms, Social Media Monitoring, Hashtag, viral content.

Social Media Marketing I - SMM Vs. SMO, Benefits of using SMM, Social Media Strategy, Email Marketing

Goals: Basic of social media, Develop a product concept for marketing purposes.

Unit-III

Social Media Marketing II- Facebook Marketing- Profiles and Pages, Business Categories, Facebook Page Custom URL, Invite Page Likes, Scheduling Posts, Facebook Events, Facebook Insights Reports, Competitor's Facebook Page, Connect with Twitter.

Facebook Ad Campaigns- Ad Objective, Performance Matrix, Ad Components, Facebook Ad Structure, Facebook Insights, Facebook Page Promotion, Video Promotion.

Goals: Develop a Facebook campaign for the product concept.

Unit-IV


Google Ads- Introduction to Ad words, Keyword Planner, PPC, PPC terminology, PPC AD on GOOGLE, FACEBOOK.

Goals: Use social media to keep abreast of the latest trends in your industry.

Unit-V

Content Marketing and security, Security for SMM, Social Media Privacy, Secure Payments and Website Encryption, Cookies, VPN, Digital Certificate, E-Governance, E-wallet.

Goals: Understand security issues related to social media and digital marketing


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Reference Books

1. Ryan Deiss, Russ Henneberry (2017) Digital Marketing for Dummies, John Wiley & Sons. ISBN 1119235596, 9781119235590.
2. Ahuja Vandana (2015) Digital Marketing, Oxford University Press. ISBN 0199455449, 9780199455447
3. Ira Kaufman, Chris Horton (2014) Digital Marketing: Integrating Strategy and Tactics with Values, A Guidebook for Executives, Managers, and Students, Routledge, ISBN 1317999754, 9781317999751
4. Matt Chiera (2018) Digital Marketers Sound Off: Tips, Tactics, Tools, and Predictions from 101 Digital Marketing Specialists, Matt Chiera, ISBN 0692121595, 9780692121597
5. Puneet Bhatia (2017) Fundamentals of Digital Marketing, Pearson India, ISBN 9352861418, 9789352861415

1PGDCS4- SECURITY LAB I

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	6	3	--	80	20	100

- **Kali Linux:** Familiarization with kali Linux, basic commands, basic networking, setting up hacking environment, downloading and installation of the tools and framework.
- **ifconfig command, ping commands:** Network configuration, ping utility, finding live host using ping, icmp packets, blocking icmp packets, modifying icmp packets.
- **Source code viewing with browser, source code viewing using curl tool, WebCrawler:** Viewing, modifying and cloning website source code using web browser built-in utility i.e developer options, Extracting saved passwords from the web browser, curl utility, viewing and downloading website source code using curl utility.
- **FTP Commands (Anonymous Login), hosts file for DNS:** Using ftp utility present in windows and Linux, downloading and uploading files to FTP server, anonymous login to FTP Server, learning about hosts file present in Linux and windows, modifying hosts file.
- **Port Scanning, OS Detection, Software Service Detection (Nmap):** Nmap and its options, scanning live hosts for open ports and services, finding running service on the target, detecting running OS on the target, running stealth scan against host and finding vulnerability on the target using nmap.



- **SQL Injection:** Basic sql query, setting up a database server, finding a vulnerable field in the website and execute the sql injection, prevention from sql injection.
- **Password cracking tools (Hydra, John the Ripper):** Understanding about hash and hashing algorithms, extracting password hashes from the system, manipulating password hashes in the system, cracking technique, dictionary attack, brute-force attack, hybrid attack.
- **Aircrack-ng (wireless hacking):** Understanding about WEP WPA WPA2 WPS, capturing packets over the wifi, capturing wifi handshake packet and cracking wifi password using captured handshake.
- **Making Virtual Machines:** Creating different VMs, Virtualization Software VMware and Virtualbox,

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Second Semester

2PGDCS1- INFORMATION AND NETWORK SECURITY

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	0	2	80	--	20	100

UNIT-I

Introduction: Security Concepts:-Confidentiality, Integrity, and Availability, Threats, Risks. Sources of Threats, Attacks Classification, Cryptography, Confusion Vs. Diffusion, Stream Ciphers Vs. Block Ciphers, Classical Cryptography, Objectives of Cryptography, Secret-Key and Public-Key Cryptography, Cryptanalysis. RC5, Blowfish. Required LAB

Goals: Information and Data Security, Methods of authentication, type of keys used in authentication.

UNIT- II

Block Ciphers Block Cipher Principles, Feistel Networks, S-Boxes and P Boxes, Block Cipher, DES, Elementary Number Theory, Prime Numbers, Factoring, Key Exchange: Diffie-Hellman, Public-Key Encryption: RSA, Entity Authentication: Passwords, Challenge-Response Algorithms, Digital Signature, Digital Certificates, X509 Certificates, SSL, HTTPS, and IPSEC. Required LAB

Goals: Different Algorithms for Generating Keys and Using these Keys for Authentication in Order to Improve the Security.

UNIT- III

Introduction to Hash Function : Message Digest: MD5 and SHA-1, Attacks on Hash Functions., MD Family, SHA Family, Trapdoor Functions, Digital Signatures, Overview of GPG, Required LAB

Goals: Learn about Different Ways to Store Passwords, using Hash Functions.

UNIT- IV

Network issues, Public-Key Infrastructure (PKI), Kerberos, Encryption Using Non-Cryptographic Tools (VI, Zip), Authentication Principles and Methods, Passwords, Two-Factor Authentication, Steganography,

Firewalls and Web Security, Intruders and Viruses, Trusted System, Password Management, Zero Knowledge Protocols, Malware – Privacy, Honey Pot, Defense Programming, Web Application Vulnerability, DHS, Attack, Semantic Attack, DOS, DDOS, Wireless Attack, Intrusion Detection System. Required LAB

Goals: Learn About PKI Which is used to facilitate the Secure Electronic Transfer of Information for a Range of Network Activities Such as E-Commerce, Internet Banking and Confidential Email.

UNIT- V

SE Linux: System Security, Contexts, Labels, How Selinux Enhanced System Security. [Required LAB]

Goals: A Kernel Security Module that Provides a Mechanism for Access Control.

Reference Books

1. William Stallings, Cryptography and Network Security, PHI.



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2. Calabrese, Info Security Intelligence-Cryptography Principles Appl- Cengage Learn.
3. Krawetz- Intro to Network Security, Cengage Learning.
4. Bruce Schneier, Applied Cryptography, John Wiley and Sons Mark Stamp.
5. Mark Stamp, Information Security: Principles and Practice. John Wiley and Sons.

2PGDCS2-DIGITAL FORENSICS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	0	2	80	--	20	100

UNIT- I

Log Analysis, Linux and Windows: What are Logs, Where they are Stored, How to Interpret the Logs. [Required LAB]

Goals: Understanding Methods of Logging: Rsyslog, Syslog and Interpreting Logs in Order to Identify Problems.

UNIT- II

Introduction to Digital Forensics, Computer Forensics, Mobile Device Forensics, Network Forensics, Forensics Data analysis and Web Forensics. Evidence - Sources of Digital Evidence, Digital Forensics Investigation, Evidence Gathering Techniques. Required LAB

Cyber Crime Investigation through Data Mining Techniques – Introduction, Data Mining, Data Mining for Digital Forensics, Classification of Crime Data, Frame Work for Web Forensics, Ontology – Motivation for Text Mining, Text Characteristics, Information Retrieval, Information Extraction, Text Mining Process, Goals, Required LAB

Goals: Forensics includes digging up hidden data, and track left by the attacker.

UNIT- III

Inverted Index Live Forensics – Incident on Windows, Linux, and Apple computers, basic registry analysis, MRUs and history file analysis. Network Forensics – Network analyzer basic, packet capturing, scan ports, upstream tools and TCP dump, Wire shark, Wireless sniffing, Log and SIEM searches Required LAB

Goals: Scanning Network for Weakness, Capturing the Data Going through the Network.

UNIT- IV

Examination and Analysis Techniques- Search Techniques, Manual Browsing. Disk Forensics – File Systems, Encryptions issues, SSD Challenges, Slack Space, Partitions Lab: DD and its many Options, Strings, Scalpel, Sleuth Kit. File System Forensics – Malware Analysis, Magic Numbers, Digital Steganography, Browser Forensics, And PST and OST Files. Social Media Forensic: - Email Forensics: Browser Tools, SQL Query, Securing Wifi, Securing DVR, Disk Encryption, (GNUPG), Required LAB, Goals: Retrieving The Lost or Corrupt Data, Securely Deleting Data in Order to prevent it from Recovery.



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UNIT- V
 Android Forensics – Introduction, Acquiring Physical Image of an Android Device, Connecting a Device via Data Cable, Imaging the Memory Card, USB Debugging, Preparing the Hero for Rooting, Creating A DD Image of Memory, Examination of Memory, Analysis with the Celle Brite, using Apps.
 Required LAB
 Goals: Gaining the Root Access in Android Phone, Collecting Information from Android.

Reference books

1. Eoghan Casey-Handbook of Digital Forensics and Investigation,
2. Windows Registry Forensics: Advanced Digital Forensic Analysis of the windows registry.
3. John Sammons-The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensic
4. Greg Gogolin -Digital Forensics Explained

2PGDCS3- SERVER HARDENING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	0	2	80	--	20	100

UNIT-I

Firewalls, CISCO, CHEKPOINT, CyberRoam, SoPhos, Pix: Software & Hardware available to enhance the network security

Goals: Complete Network Security, Prevent Unauthorized Access to Network with Stateful and Deep Packet Inspection for Network, Application and user Identity-Based Security.

UNIT-II

Centralized Authentication, IPA Server, And LDAP: Create, Delete, Modify Users and Specify Permission for Users From a Centralized Servers.

Goals: Server that Provides Centralized Authentication, Authorization and Account Information by Storing Data About User, Groups, Hosts and other Objects Necessary to Manage the Security Aspects of a Network of Computers.

UNIT-III

CVE (Common Vulnerability and Exposure), OWASP: Online Platform/Database for Known Vulnerabilities, Gaining Knowledge about the Vulnerability, Using the Existing Exploit, Modifying the Exploits as per needs.

Goals: To Know About Organization that Operates Research to Identify and Catalog Vulnerabilities in Software or Firmware into a Free "Dictionary" for Organizations to Improve their Security.

UNIT-IV

Advance ACL, PAM: ACL Rules, How ACL Rules Works, How to apply, and Authentication Schemes using PAM, Working with API.

Goals: Help us to Provide Dynamic Authentication Support for Applications and Services in a Linux System.

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UNIT-V

Data Recovery after Ransomware, HDD Crash, Android Data Recovery: Data recovery using Software's
Goals: How to Recover Data in Different Scenario i.e. after a Ransomware Attack, Data wipe etc.

Reference book

1. Michael Sikorski, Andrew Honig - "Practical Malware Analysis: The HandsOn Guide to Dissecting Malicious Software" publisher Williampollock
2. Donald A. Tevault-Mastering Linux Security and Hardening: Secure your Linux server and protect it from intruders, malware attacks, and other external threats

2 PGDCS 4-SECURITY LAB II

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	6	3		80	20	100

- **Hashing Calculator:** Calculating hash of a given file, identify whether the file has been modified, how file hashing works.
- **Wireshark:** Utility to capture network packets, monitoring packets travelling through the network, differentiate b/w packets, understanding http and https packets, capturing http packets carrying password.
- **Metasploit:** A Framework consist of various exploits and payloads, finding a vulnerability in remote host, exploiting found vulnerability using metasploit, gaining and maintaing access to the system.
- **Nikto:** Scanning network using nikto, finding vulnerability in website and web application and finding a possible vulnerable host present in the network and exploiting hosts.
- **Centralized users:** Creating and managing centralized, why centralized users are needed, problems related to centralized users.
- **Logs:** Viewing and understating logs, identify and resolving a persisting problem in the system using logs, Monitoring tools, Windows Event Viewer.
- **Debugger:** Debugging Tools, backtracking a software or a malware, finding malicious code present in the software.

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