# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Forensic Science
## M.Sc. Cyber Forensics

**SEMESTER- II**

**Name of Program-M.Sc. Cyber Forensics**

| Subject Code | Category | Subject Name | Teaching & Evaluation Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Theory | | | Practical | | Th | T | P | Credits |
| | | | End Sem University exam | Two term exam | Teacher Assessment | End Sem University exam | Teacher Assessment | | | | |
| MSCFN201 | Compulsory | Penetration System | 60 | 20 | 20 | 0 | 0 | 4 | 0 | 0 | 4 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Objectives:**

The student will have ability :

1. To understand the different Vulnerabilities in network and system.

2. To learn different Tools and Technique to Hack into the System.

**Course Outcomes**:

Upon completion of the subject, students will be able to:

1. Understand Security Architecture.

2. Understand Vulnerability assessment Technique.

3. Summarize tools and techniques to carry out a penetration testing.

4. Interpretation of intruders escalating privileges.

5. Apply the techniques for real world problems in the domain

**UNIT I Security Architecture:**

Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security mechanism, Fundamental Security Design Principles, Attack Surface and Attack trees, A Model for Network Security. Introduction to Cybercrime, Cybercrime and Information Security, Classification of Cybercrimes

**UNIT II Vulnerability Assessment**:

Casing the Establishment: What is foot printing, Internet Foot printing, Scanning, Enumeration, basic banner grabbing, Enumerating Common Network services .Use of NMAP Tool. Case study: Network Security Monitoring. Securing permission: Securing file and folder permission, Using the encrypting file system, Securing registry permissions. Securing service: Managing service permission, Default services in windows 2000 and windows XP. UNIX: The Quest for Root, Remote Access vs Local access, Remote access, Local access, after hacking root.

**UNIT III Attack Plan:**

Introduction to Cyber offence, How Criminal plan the attack, Social Engineering, Cyber stalking, Cybercafé and cybercrime, Botnets: The fuel of cybercrime, Attack vector, cloud computing. Cybercrime: Mobile and Wireless devices, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Security Challenges Posed by Mobile Devices, Registry Setting for Mobile Devices, Authentication Service Security, Attack on Mobile Phones..

**UNIT IV Penetration Testing**:

Malware threats, penetration testing by creating back doors Tools and Methods Used in Cybercrime, Proxy Server and Anonymizers, Phishing and Identity Theft, Password Cracking, Keylogger and Spyware, Virus and Worms, Trojan Horse and Backdoors, Steganography DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attack on Wireless Networks. Use of Tool Nessus

**UNIT V Hacking Techniques:**

Dial-up, PBX, Voicemail and VPN hacking, Preparing to dial up, War-Dialing, Brute-Force Scripting PBX hacking, Voice mail hacking, VPN hacking, Network Devices: Discovery Autonomous System Lookup, Public Newsgroups, Service Detection, Network Vulnerability, Detecting Layer 2 Media.

**Suggested Reading:**

1. Cryptography And Network Security Principles And Practice Fourth Edition, William Stallings, Pearson Education
2. Modern Cryptography: Theory and Practice, by Wenbo Mao, Prentice Hall PTR
3. Network Security Essentials: Applications and Standards, by William Stallings. Prentice Hall
4. Cryptography: Theory and Practice by Douglas R. Stinson, CRC press.
5. "Building Internet Firewalls", Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman, 2nd Edition, Oreilly.
6. http://nptel.ac.in/
7. Stuart McClure, Joel Scambray and Goerge Kurtz, ―Hacking Exposed Network Security Secrets & Solutions‖, 5th Edition, Tata McGraw Hill Publishers, 2010.
8. RafayBaloch, ―A Beginners Guide to Ethical Hacking..
9. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, ―Gray Hat Hacking The Ethical Hackers Handbook‖, 3rd Edition, McGraw-Hill Osborne Media paperback(January 27, 2011)
10. ."Cryptography and Network Security", William Stallings, 2nd Edition, Pearson Education Asia
11. Stuart McClure, Joel Scambray and Goerge Kurtz, Hacking Exposed 7: Network Security Secrets & Solutions, Tata McGraw Hill Publishers, 2010.
12. Bensmith, and Brian Komer, Microsoft Windows Security Resource Kit, Prentice Hall of India, 2010.

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## M.Sc. Cyber Forensics

**SEMESTER- II**

**Name of Program- M.Sc. Cyber Forensics and IT Security**

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| MSCFN202 | Compulsory | Incident Handling | 60 | 20 | 20 | 0 | 0 | 5 | 0 | 0 | 5 |

**Legends**: **L**– Lecture; **T**– Tutorial/Teacher Guided Student Activity; **P** – Practical; **C**– Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Learning objective:**

1. This course will introduce the Incident Handling Process.
2. Introduce the knowledge about how one can detect intrusions or intrusion attempts by analyzing network traffic and network flows.
3. One can prepare and defend against each stage of the cyber kill chain under practical incident handling

**Learning Outcome**

1. Obtain basic knowledge on dealing with system security related incidents.
2. Increase knowledge on potential defenses and counter measures against common threat vectors/vulnerabilities.
3. Gain experience using tools and common processes in performing analysis of compromised systems and dynamic malware analysis.
4. Obtain current knowledge of events and tools/support kits in the subject area.
5. Professionally analyze, handle, and respond to security incidents onheterogeneous networks and assets.
6. Understand the mechanics of modern cyber-attacks and how to detect them.
7. Detect and even (proactively) hunt for intrusions by analyzing traffic, flows and endpoints, as well as utilizing analytics and tactical threat intelligence.

## Unit-1 Introduction to Incident Response

What Is a Computer Security Incident, What Are the Goals of Incident Response, Who Is Involved in the Incident Response Process, Incident Response Methodology, Pre-Incident Preparation, Detection of Incidents, Initial Response, Investigate the Incident.

## Unit-2 Data Collection

Creating a Response Toolkit, Storing Information Obtained during the Initial Response, Obtaining Volatile Data, Performing an In-Depth Live Response.

## Unit- 3 Forensic Duplication

Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirement, creating a Forensic Duplicate of a Hard Drive, Creating a Qualified Forensic Duplicate of a Hard Drive.

## Unit-IV Computer Forensic Reports

What is computer forensic report, who is an expert report, report goals, report writing guidelines, flow chart of computer forensic report.

## Unit-V Cyber Crime Scene Management

Investigative Tools and Equipment Tool Kit, Securing and Evaluating the Scene, Documenting the Scene, Evidence Collection, Packaging, Transportation, and Storage,

## Suggested Reading

1. Chris Prosise& Kevin Mandia, Incident Response & Computer Forensics,McGraw-Hill Publication
2. Electronic Crime Scene Investigation A guide for First Responders, US Dept. Justice.
3. Private Ltd. New Delhi.
4. Gilbert M. Masters and Wendell P. Ela.(2008).**Environmental Engineering and science**. PHI Learning PvtLtd.
5. Daniel B. Botkin& Edwards A. Keller(2008).**Environmental Science** Wiley INDIAedition.
6. AnubhaKaushik(2009).**EnviromentalStudies**. New age internationalpublishers.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | Th | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| BTIT502 | | Computer Networks | 60 | 20 | 20 | 30 | 20 | 3 | 1 | 2 | 5 |

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## COURSE OBJECTIVES

The student should be made to:

1. Build an understanding of the fundamental concepts of computernetworking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networkingarea.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computernetworking.

## COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Independently understand basic computer networktechnology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies andprotocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of eachlayer.
5. Identify the different types of network devices and their functions within anetwork
6. Understand and building the skills of sub netting and routingmechanisms.

**UNIT-I**

**Computer Network:** Definitions, goals, components, Architecture, Classifications & Types. Layered Architecture: Protocol hierarchy, Design Issues, Interfaces and Services, Connection Oriented & Connectionless Services, Service primitives, Design issues & its functionality. ISO- OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization.

**UNIT–II**

**Data Link Layer:** Need, Services Provided, Framing, Flow Control, Error control. Data Link Layer Protocol: Elementary & Sliding Window protocol: 1-bit, Go-Back-N, Selective Repeat, Hybrid ARQ. Bit oriented protocols: SDLC, HDLC, BISYNC, LAP and LAPB.

**UNIT–III**

**MAC Sublayer:** MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted- ALOHA), CSMA/CA, CSMA/CD Ethernet, token bus, token ring, (IEEE 802.3, IEEE 802.4, IEEE 802.5)

**UNIT–IV**

**Network Layer:** Need, Services Provided , Design issues, Routing and congestion in network layer, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multi cast Routing. IP protocol, IP Addresses, Subneeting, Comparative study of IPv4 & IPv6, Mobile IP.

**UNIT–V**

**Transport Layer:** Design Issues, UDP: Header Format, Per-Segment Checksum, Carrying Unicast/Multicast Real-Time Traffic, TCP: Connection Management, Reliability of Data Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management.**Session layer:** Authentication, Authorisation, Session layer protocol. **Presentation layer:** Data conversion, Encryption and Decryption, Presentation layer protocol (LPP, Telnet, X.25 packet Assembler/Disassembler).**Application Layer:** WWW and HTTP, FTP, SSH, Email (SMTP, MIME, IMAP), DNS, Network Management (SNMP).

**TEXT BOOKS:**

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

**REFERENCES:**

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH,2013.
2. "Networking Fundamentals", KavehPahlavan, PrashantKrishnamurthy,WileyPublication.
3. "Computer Communications & Networking Technologies" Michael A. Gallo & WilliamM. Hancock Cengagepearsenpublications.

**LIST OF EXPERIMENTS:**

1. Study of Different Types of NetworkEquipment's.
2. Color coding standard of CAT 5, 6, 7 and crimping of cable inRJ-45.
3. LAN installations andConfigurations.
4. Study of basic network command and Network configurationcommands.
5. Study of networkIP.
6. Write a program to implement various types of error correctingtechniques.
7. Write a program to implement various types of farmingmethods.
8. Study of Tool Command Language(TCL).
9. Study and Installation of Standard Network Simulator:N.S-2.
10. Implement & simulate various types of routingalgorithm.
11. Study & Installation of ONE (Opportunistic Network Environment) Simulator for High MobilityNetworks.
12. Simulate STOP AND WAIT Protocols onNS-2.
13. Simulate various Routing Protocol onNS-2.
14. Simulate various Network Topologies onNS-2.
15. Configuring routers, bridges and switches and gateway onNS-2.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | Th | T | P | CREDITS |
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| BTCS405 | | Data Base Management System | 60 | 20 | 20 | 30 | 20 | 3 | 1 | 2 | 5 |

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**COURSE OBJECTIVES**

The student will have ability to:

1. To understand the dissimilar issues concerned in the intend and implementation of a database system.
2. To learn the physical and logical database design, database modeling, relational, hierarchical, and network models
3. To understand and develop data manipulation language to query, modernize, and manage a database
4. To expand an understanding of necessary DBMS concepts such as: database security, integrity, concurrency,
5. To intend and build a straightforward database system and show competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
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## COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Evaluate business information problem and find the requirements of a problem in terms of data.
2. Understand the uses the database schema and need for normalization.
3. Design the database schema with the use of appropriate data types for storage of data in database.
4. Use different types of physical implementation of database
5. Use database for concurrent use.
6. Backup data from database.

## SYLLABUS

### UNIT–I
### INTRODUCTION TO DATABASE CORE CONCEPTS AND APPLICATIONS:

What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management, Introduction to File and Database systems- Database system structure , Data Models , Introduction to Network and Hierarchical Models , ER model , Relational Model , Relational Algebra and Calculus.

### UNIT–II
### RELATIONAL DATA STRUCTURE: SQL

Relations, Domains, Attributes, Keys, Extensions and Intentions, Base Table, Indexes, System R, Data Manipulation, Retrieval, Operations, Built-in-Functions, Update Operations, Introduction of SQL, Multi table Queries, Nested Queries or Sub queries, Multiple Row Nested Queries, Data Manipulation Language, The Create Table Statement

### UNIT–III
### DATA STORAGE AND QUERY PROCESSING:

Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques , Index Structure for files ,Different types of Indexes- B-Tree - B+Tree ,Query Processing.

**UNIT–IV**

**RELATIONAL DATABASE DESIGN AND TRANSACTION MANAGEMENT:**

Relational algebra, Traditional Set operations, Attribute Name for Derived Relations, Special Relational Operations, Relational Calculus, Type Oriented Relational Calculus, Further Normalization, Functional Dependence, First, Second and Third Normal forms, Relations with more than one candidate key, Good and Bad Decompositions, Fourth Normal Form, Fifth Normal Form. Transaction Processing: Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules , Concurrency Control , Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control , Recovery Techniques , Concepts- Immediate Update- Deferred Update - Shadow Paging.

**UNIT-V**

**THE NETWORK APPROACH AND SECURITY AND INTEGRITY:**

The architecture of an IMS system, Background, Architecture, IMS Data Structure, Physical Database, The Database Description, Hierarchical Sequence, IMS data manipulation, Defining the Program Communication Block (PCB). The DL/I Examples, Constructing the Segment Search Argument, using more than one PCB. Object Oriented Databases , Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage , XML , Structure of XML- Data- XML Document- Schema- Querying and Transformation. , Data Mining and Data Warehousing.Introduction, Security and Integrity Violations, Authorization, Granting of Privileges, Security Specification in SQL

**TEXTBOOKS:**

1. A Silberschatz, H Korth, S Sudarshan, “Database System and Concepts”, fifth Edition McGraw-Hill ,
2. Rob, Coronel, “Database Systems”, Seventh Edition, Cengage Learning.
3. Date C J, “An Introduction To Database System”, Pearson Educations
4. Elmasri, Navathe, “Fundamentals Of Database Systems”, Pearson Educations

**REFERENCES:**

1. Understanding SQL by Martin Gruber, BPB.
2. SQL- PL/SQL by Ivan bayross.
3. Oracle – The complete reference – TMH /oracle press.
4. AtulKahate , " Introduction to Database Management System", Pearson Educations.
5. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press, TMH.
6. Paneerselvam,"DataBase Management System", PHI Learning.
7. Sanjeev Sharma, JitendraAgarwal, ShikhaAgarwal, "Advanced DBMS", Dreamtech Publication

**LIST OF EXPERIMENTS:**

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key , Foreign key, NOT NULL to the tables.
3. Write a sql statement for implementing ALTER,UPDATE and DELETE
4. Write the queries to implement the joins
5. Write the query for implementing the following functions: MAX(),MIN(),AVG(),COUNT()
6. Write the query to implement the concept of Integrity constrains
7. Write the query to create the views 8) Perform the queries for triggers .
8. Perform the following operation for demonstrating the insertion , updation and deletion using the referential integrity constraints
9. Write the query for creating the users and their role.

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| MSCFN2031 | Elective | Intellectual Property Right | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

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### Learning Objectives:

1. To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.
2. To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
3. To disseminate knowledge on copyrights and its related rights and registration aspects
4. To disseminate knowledge on trademarks and registration aspects
5. To disseminate knowledge on Design,Layout Design Protection and their registration aspects
6. To aware about current trends in IPR and Govt. steps in fostering IPR

### Learning outcomes:

1. The students , shall get an adequate knowledge on patent and copyright for their innovative research works
2. During their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search.
3. This provide further way for developing their idea or innovations

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4. Pave the way for the students to catch up Intellectual Property(IP) as an career option
   a. R&D IP Counsel
   b. Government Jobs – Patent Examiner
   c. Private Jobs
   d. Patent agent and Trademark agent
   e. Entrepreneur

**Unit-I**

**Overview of Intellectual Property**

Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design – Genetic Resources and Traditional Knowledge – Trade Secret - IPR in India : Genesis and development – IPR in abroad - Major International Instruments concerning Intellectual Property Rights: Paris Convention, 1883, the Berne Convention, 1886, the Universal Copyright Convention, 1952, the WIPO Convention, 1967,the Patent Co-operation Treaty, 1970, the TRIPS Agreement, 1994

**UNIT-II**

**Patents**

Patents - Elements of Patentability: Novelty , Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties - Patent office and Appellate Board.

**UNIT-III**

**Copyrights**

Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Assignment and licence of copyright - Infringement, Remedies & Penalties – Related Rights - Distinction between related rights and copyrights

**UNIT-IV**

**Trademarks**

**Concept of Trademarks** - Different kinds of marks (brand names, logos, signatures, symbols, well known marks, certification marks and service marks) - Non Registrable Trademarks - Registration of Trademarks - Rights of holder and assignment and licensing of marks - Infringement, Remedies & Penalties - Trademarks registry and appellate board

**UNIT-V**

Design

**Design:** meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection

India`s New National IP Policy, 2016 – Govt. of India step towards promoting IPR – Govt. Schemes in IPR – Career Opportunities in IP - IPR in current scenario with case studies

**Suggested reading**

1. Nithyananda, K V. (2019). Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited.
2. Neeraj, P., &Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited. \
3. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis.

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| MSCFN -2032 | Elective | Image Processing | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

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**Learning Objectives: this course will enable the students to:**

1. Analyze techniques such as image denoising, image segmentation and edge detection
2. Apply spatial and frequency domain filters on an image.
3. Analyze the effects of image transforms.

**Learning outcomes:**

1. Explain the essentials of digital image processing.
2. Describe various segmentation techniques for image analysis.
3. Outline the various feature extraction techniques for image analysis
4. Discuss the concepts of image registration and fusion.
5. Illustrate 3D image visualization.

**UNIT-I**

**REVIEW OF DIGITAL IMAGE PROCESSING**

Steps in digital image processing-Elements of visual perception- brightness adaptation, Machband effect. Image enhancement in spatial and frequency domain, Histogram equalization

**UNIT-II**

**SEGMENTATION**

Edge detection, Thresholding, Region growing, Fuzzy clustering, Watershed algorithm, Active contour models, Texture feature based segmentation, Graph based segmentation, Wavelet based Segmentation - Applications of image segmentation.

**UNIT-III**

**FEATURE EXTRACTION**

First and second order edge detection operators, Phase congruency, Localized feature extraction - detecting image curvature, shape features, Hough transform, shape skeletonization, Boundary descriptors, Moments, Texture descriptors- Autocorrelation, Co-occurrence features, Runlength features, Fractal model based features, Gabor filter, wavelet features.

**UNIT-IV**

**REGISTRATION AND IMAGE FUSION**

Registration - Preprocessing, Feature selection - points, lines, regions and templates Featurecorrespondence - Point pattern matching, Line matching, Region matching, Template matching. Transformation functions - Similarity transformation and Affine Transformation. Resampling – NearestNeighbour and Cubic Splines. Image Fusion - Overview of image fusion, pixel fusion, wavelet based fusion -region based fusion.

**UNIT-V**

**3D IMAGE VISUALIZATION**

Sources of 3D Data sets, Slicing the Data set, Arbitrary section planes, The use of color, Volumetric display, Stereo Viewing, Ray tracing, Reflection, Surfaces, Multiple connectedsurfaces, Image processing in 3D, Measurements on 3D images.

**Suggested Reading:**

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing',Pearson,Education, Inc.,Second Edition, 2004.
2. Mark Nixon, Alberto Aguado, "Feature Extraction and Image Processing", Academic Press,2008.
3. ArdeshirGoshtasby, " 2D and 3D Image registration for Medical, Remote Sensing and Industrial Applications",John Wiley and Sons,2005.
4. John C.Russ, "The Image Processing Handbook", CRC Press,2007.
5. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson Education, Inc., 2002.
6. Rick S.Blum, Zheng Liu, "Multisensor image fusion and its Applications", Taylor&Francis,2006.
7. John C. Russ, F. Brent Neal-The Image Processing Handbook, Seventh Edition, The Kindle edition (2016), CRC Press,Taylor& Francis Group.

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| **MSFS–2051** | **E** | **Introduction To Biometric Technologies In Forensic Science** | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 0 |

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**Course Objectives**: The course aims to provide the students with
1. Importance of biometric analysis
2. The significance of voice identification.
3. The information and working procedure in brain fingerprinting Narco analysis.

**Course Outcomes:** After studying this course students will
1. Be able to know importance of biometric system
2. Know significance of voice identification

**UNIT I: Introduction of Biometric systems**
Introduction, Biometric systems: Enrollment and recognition phases, sensor module, feature extraction module, database module, matching module, Biometrics Functionality: Verification & Identification, Biometrics system errors performance measures, Design cycle of biometric System: Nature of the application, Choice of biometric trait, Data collection, Choice of features and matching, Application of biometric system, Security and privacy issues

**UNIT II: Security of Biometric**
Introduction to Security of Biometric System, Adversary attacks: Insider Attacks, Infrastructure attacks, Attacks on user Interface: Impersonation, Obfuscation, Spoofing, Countermeasure of spoof detection, Attacks on biometrics processing : On system modules & at interconnections, Attack on template database & Countermeasures in biometric template security.

**UNIT III: An Introduction to Statistical Measures of Biometrics**

Recommended Biometric for Network Security: Introduction, Implementation of Biometrics for Network Security. Finger Biometrics, Voice Biometric, Definition & applications of FAR, FRR, FTE, EER. Biometric Transaction: User, Biometric reader, Matching location, Biometric Reader: Trusted, Non-Trusted.

**UNIT IV: Types of Biometric Technology and Verification Systems**

Introduction, Biometric verification, Use of Biometric, Biometric Technologies for Personal Identification, Retina recognition, Signature Dynamics or Recognition, Keystroke Dynamics, Speaker recognition, RFID Chip implant Business and Federal

**UNIT V: Applications of Biometric Technologies**

Applications of Biometric Technologies, Challenges and Issues in Using Biometrics, Risk Management Is the Foundation of Effective Strategy, Barriers to Future Growth, Biometric technologies under development: Blood pulse, Nailbed Identification, Body salinity Identification, Palm print, Palm print, vein Pattern, Facial thermography, Skin Luminescence, Brain Wave Pattern, Electronic Nose Identification, Foot Dynamics.

**Reference Books:**

1. S. Nanavati, M. Thieme and R. Nanavati, Biometrics, Wiley India Pvt. Ltd. (2002).
2. P. Reid, Biometrics for Network Security, New Delhi (2004).
3. J.R. Vacca, Biometric Technologies and Verification Systems, Butterworth-Heinemann, Oxford (2007).

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Forensic Science
# M.Sc. Cyber Forensics

**SEMESTER- II**

**Name of Program- M.Sc. Cyber Forensics**

| Subject Code | Category | Subject Name | Teaching & Evaluation Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Theory | | | Practical | | Th | T | P | Credits |
| | | | End Sem University exam | Two term exam | Teacher Assessment | End Sem University exam | Teacher Assessment | | | | |
| MSCFN204 | Compulsory | Lab-I | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 2 | 1 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;

*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

## Practical list

1. Installation of Kali Linux.
2. Introduction to NMAP Tool.
3. Basic NMAP Feature.
4. Host discovery using NMAP
5. Vulnerability assessment: Using Nessus.
6. Malware threats, penetration testing by creating backdoors.
7. Study of tools for Packet sniffing.
8. Creating Virus for different systems.
9. Study of Password cracking tools.
10. Basic Future of Nessus.
11. Hacking wireless networks
12. Hacking into System through Vulnerability.
13. To study Basic SQL commands (create database, create table, use, drop, insert) and execute the following queries using these commands:

a) Create a database named „ Employee‟.
b) Use the database „Employee‟ and create a table „Emp‟ with attributes „ename‟, ecity‟, ‟salary‟, ‟enumber‟,‟eaddress‟,‟depttname‟.
c) Create another table „Company‟ with attributes „cname‟, ccity‟,‟empnumber‟ in the database „Employee”.

14. To study the viewing commands (select , update) and execute the following queries using these commands:

a) Find the names of all employees who live in Delhi.
b) Increase the salary of all employees by Rs. 5,000.
c) Find the company names where the number of employees is greater than 10,000.
d) Change the Company City to Gurgaon where the Company name is „TCS".

15. To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:

a) Add an attribute named „ Designation" to the table „Emp".
b) Modify the table „Emp", Change the datatype of „salary" attribute to float.
c) Drop the attribute „depttname" from the table „emp".
d) Delete the entries from the table „ Company" where the number of employees are less than 500.

16. To use (and, or, in , not in, between , not between , like , not like) in compound conditions and execute the following queries using them:
    a) Find the names of all employees who live in „Gurgaon" and whose salary is between Rs. 20,000 and Rs. 30,000.
    b) Find the names of all employees whose names begin with either letter „A" or „B".
    c) Find the company names where the company city is „Delhi" and the number of employees is not between 5000 and 10,000.
    d) Find the names of all companies that do not end with letter „A".
17. Using aggregate functions execute the following queries:
    a) Find the sum and average of salaries of all employees in computer science department.
    b) Find the number of all employees who live in Delhi.
    c) Find the maximum and the minimum salary in the HR department.
18. To execute the following queries using study the grouping commands (group by, order by)

a) Find number of employees in each department where number of employees is greater than 5.
b) List all the department names where average salary of a department is Rs.10,000.

19. To write SQL queries.
c) Alter table „Emp‟ and make „enumber‟ as the primary key.
d) Alter table „Company‟ and add the foreign key constraint.
e) Add a check constraint in the table „Emp‟ such that salary has the value between 0 and Rs.1,00,000. Alter table „Company‟ and add unique constraint to columncname.
f) Add a default constraint to column ccity of table company with the value „Delhi‟. Rename the name of database to „Employee1‟.
g) Rename the name of table „Emp‟ to „Emp1‟.
h) Change the name of the attribute „ename‟ to „empname‟.
20. To execute following queries using appropriate
a) Retrieve the complete record of an employee and its company from both the table using joins.
b) List all the employees working in the company „TCS‟.
21. To study the various set operations and execute the following queries using these commands:
a) List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
b) List the enumber of all employees who live in Delhi but whose company is not in Gurgaon.
22. To study the various scalar functions and string functions ( power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands:
a) Reverse the names of all employees.
b) Change the names of company cities to uppercase.
c) Concatenate name and city of the employee.
23. To study the commands for views and execute the following queries using these commands:
a) Create a view having ename and ecity.
b) In the above view change the ecity to „Delhi‟ where ename is „John‟.
c) Create a view having attributes from both the tables.
d) Update the above view and increase the salary of all employees of IT department by Rs.1000.
24. To study the commands involving indexes and executes the following queries:
a) Create an index with attribute ename on the table employee.
b) Create a composite index with attributes cname and ccity on table company.

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**Shri VaishnavVidyapeethVishwavidyalaya, Indore**
**Shri Vaishnav Institute of Information Technology**
**Choice Based Credit System (CBCS) in Light of NEP-2020**

**(2021-2025)**

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING&EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | ENDSEM UniversityExam | TwoTermExam | TeachersAssessment* | ENDSEM UniversityExam | TeachersAssessment* | | | | |
| MSCFNCS401 | ODC | **Advanced Java Programming** | - | - | - | 30 | 20 | - | - | 4 | 2 |

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**Course Objectives:**

The student will have ability to:
1. Understand Java Environment for application development.
2. Understand Programming using Object Oriented Technology.
3. Develop computer program to solve specific problems.
4. Create debug and run java standalone applications.

**Course Outcomes:**

Upon completion of the subject, students will be able to:
1. Design new applications using object oriented methodologies.
2. Explore various system libraries
3. Analyze and improve performance of applications.
4. Design Data base connectivity program for simple problems.

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## Shri Vaishnav Institute of Information Technology
## Choice Based Credit System (CBCS) in Light of NEP-2020

## (2021-2025)

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### Syllabus

**Unit-I**

**The Java Environment:** Java Features, JVM, JRE and JDK, its Libraries and Functionalities, Why Java, Installing Java, Java Classes and Objects, Variables and Data Types Conditional and Looping, Arrays.

**Unit-II**

**The Java Language:** Constructors, Inheritance, Methods Overloading vs Method Overriding, Polymorphism, Abstract methods and Classes, Packages and Interfaces, Access specifiers, Enumerations.

**Unit-III**

**Exception Handling:** Exception and Errors ,Types of Exception, Control Flow in Exceptions, JVM Reaction to Exceptions, Use of Try, Catch, Finally, Throw, Throws in Exception Handling, In-Built and User Defined Exceptions, Checked and Unchecked Exceptions.

**Unit-IV**

**Multithreading:** Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads.

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**Unit-V**

**Database Connectivity with JDBC:** Introduction to JDBC, JDBC Drivers & Architecture, CRUD Operation using JDBC. The Java Library: String Handling, Exploring Java.Lang, Java.Util Framework, Exploring Java.IO, Exploring Java.NIO.

**List of experiments:**

1. Writ a Program to print hello world in JAVA.
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a program to show Access specifiers (Public, Private, Protected) in JAVA
5. Write a program to show use and Advantages of CONTRUCTOR.
6. Write a Program to show Inheritance.
7. Write a program to showing Different types of Polymorphism.
8. Write a program to show how a class implements two interfaces.
9. Write a program to show How Exception Handling is in JAVA.
10. Write a program to show Life Cycle of a Thread.
11. Write a program to demonstrate multithreading using Java.
12. Write a program to calculate and print the age of an employee from the date of birth.
13. Write a program to concatenate string "First" and "Year" and print.
14. Write a Program to show Data Base Connectivity Using JAVA
15. Write a Program to show Connectivity using JDBC.

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**Text Books:**


1. Herbert Schildt, "The Complete Reference Java", Ninth Edition, McGraw Hill, 2014
2. Kishore Sharan, "Beginning Java 8 Language Features", Apress, 2014
3. E. Balagurusamy, "Programming with java A Primer", Fourth Edition, TMH, 2009.


**Refrences:**


1. E. Balaguruswamy, "Programming In Java"; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH
3. Deitel&Deitel, "JAVA, How to Program"; PHI, Pearson.


| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |