



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Forensic Science
B.Sc. (Hons) Digital & Cyber Forensics- Batch (2021-24)

SEMESTER- IV

Course Code	Category	Course Name	Teaching & Evaluation Scheme								
			Theory			Practical		Th	T	P	Credits
			End Sem University	Two Term Exam	Teacher Assessment*	End Sem University exam	Teacher Assessment*				
BSDFN401	Compulsory	Online Social Network Forensics	60	20	20	30	20	3	0	2	4

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

***Teacher Assessment** shall be based on 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 to:

1. Understand fundamentals of social media networks.
2. Understand dynamics and evolution of social networks.
3. Acquainted to protect personal data, securing simple computer networks, and safe Internet usage.

COURSE OUTCOMES

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

1. Understand how various social media networks are working and using SNA in their infrastructure.
2. Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.
3. Understand dynamics and evolution of social networks.
4. Understand the framework of network analysis.

SYLLABUS

Unit-I

Introduction to Cybercrimes and Cyber security. Cybercrime Scenario in India. Various cybercrimes and their legal status around the World. Introduction to online social networking, social network forensics. Top social networking sites currently available in India and their privacy and security measures.

Unit-II

Indian Laws to counter cybercrimes in India. Introduction to Indian IT Act. Major Cyber Crimes and their punishments as provided in Indian Information Technology Act. Challenges to prevent cybercrimes in India. Security and Privacy in Social Network.

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Unit-III

Understanding ethics, Cyber Ethics. Cyber security and Society. Understanding privacy issues over internet. Regulation and Jurisdiction for global Cyber security. Introduction to Intellectual Property. Piracy, Internet Infringement, Fair Use, Postings, and Criminal Liability.

Unit-IV

Introduction to Social Media Behavior. Social Ties and Information Diffusion. Social Ties and Link Prediction, Social Network Analysis, and online social networks -Concepts: How Services such as Facebook, LinkedIn, Twitter, Couch Surfing, etc. are using SNA to understand their users and improve their functionality.

Unit-V

Privacy in a Networked World, Social Spam and Malicious Behavior, Leakage and Linkage of user information and content, predicting the future with social media, Friendship paradox and detection of contagions. Social Media and Network Analysis.

List of Practical:

1. To review Indian laws related to online social networking crimes.
2. Case study of Cyber Crimes.
3. Case study in which punishment awarded as per IT Act.
4. Practical analysis of Social Networking sites.
5. Finding out the vulnerable data on Social Networking sites.
6. Case study of Social Networking related crimes
7. Any other practical/ visit may be conducted based on the syllabus.

Suggested Reading:

1. Sunit Belapure and Nina Godbole, Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley India Pvt. Ltd, 2011.
2. John Scott, Social Network Analysis, 3rd Edition, SAGE, 2012.
3. Wouter de Nooy, Andrej Mrvar, Vladimir Batagelj, Exploratory Social Network Analysis with Pajek, 2nd Revised Edition, Cambridge University Press, 2011
4. Patrick Doreian, Frans Stokman, Evolution of Social Networks, Routledge, 2013.

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			Theory			Practical		Th	T	P	Credits
			End Sem University	Two Term Exam	Teacher Assessment*	End Sem University exam	Teacher Assessment*				
BSDFN402	Compulsory	Incidence Response Management	60	20	20	30	20	4	0	2	5

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

***Teacher Assessment** shall be based on 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 to:

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.

COURSE OUTCOMES

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

1. The Professionally analyze, handle, and respond to security incidents on heterogeneous networks and assets.
2. The mechanics of modern cyber-attacks and how to detect them.
3. To Detect and even (proactively) hunt for intrusions by analyzing traffic, flows and endpoints, as well as utilizing analytics and tactical threat intelligence.

SYLLABUS

Unit I:

Introduction to Computer Security Incidents, Goals of Incident Response, Who Is Involved in the Incident Response Process, Incident Response Methodology.

Unit II:

Overview of Pre-incident Preparation, Identifying Risk, Preparing Individual Hosts, preparing a Network, Establishing Appropriate Policies and Procedures, Creating a Response Toolkit, Establishing an Incident Response Team.

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Unit III:

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

Unit IV:

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

Unit V:

Introduction to Evidence, The Challenges of Evidence Handling, Overview of Evidence-Handling Procedures, What Is Network-based Evidence, Types of Network Monitoring, Setting Up a Network Monitoring System, Performing a Trap-and-Trace.

List of Practical:

1. To perform Preparation, Identification, Containment, Eradication, Recovery, and Lessons Learned of stimulated incident.
2. To use FTK for forensic duplication
3. To perform data collection from live network
4. To write cyber forensic report.
5. To handle incident using crime scene management principles.
6. To collect volatile data using FTK
7. Any other practical/ visit may be conducted based on the syllabus.

Suggested Reading:

1. CHRIS PROSISE & KEVIN MANDIA “INCIDENT RESPONSE & COMPUTER FORENSICS” Second Edition, McGraw-Hill/Osborne, 2003
2. Steve Anson “Applied Incident Response”, Wiley Publisher, 2020
3. Gerard Johansen “Digital Forensics and Incident Response” Packt Publisher, 2017.

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			Theory			Practical		Th	T	P	Credits
			End Sem University	Two Term Exam	Teacher Assessment*	End Sem University exam	Teacher Assessment*				
BSDFN402	Compulsory	Basics of Python Programming	0	0	0	30	20	0	0	4	2

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 10marks.

COURSE OBJECTIVES

The student will have ability to:

1. Understand basics of Python programming.
2. Get acquainted with variables in python.
3. Implement basic functions in python.

COURSE OUTCOMES

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

1. Understand basics of Python programming.
2. Get acquainted with variables in python.
3. Implement basic functions in python.
4. Apply conditional statements in python.

SYLLABUS

Unit-I

Introduction to Python. Python IDE/Editor Installation. Basics of Python programming. Object-oriented Programming. Basic Python syntax. Datatypes in Python. Python Variables.

Unit-II

Functions: Types of Function. Creating User-defined Function. Control Statements. List, Ranges & Tuples in Python. Python Dictionaries and Sets. Python Regular Expressions.

Unit-III

Python Multithreaded Programming. Input and Output in Python. Python built in function. Exceptions. If Statement. If Else Statement.

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Unit-IV

Conditional Statements: If else and Nested, If else and elif. Loops in Python: For Loop, While Loop and Nested Loops.

Unit-V

String Manipulation: Basic Operations, Slicing, Functions and Methods. Using Databases in Python. Python Libraries. Creating Python Libraries. Data visualization.

Suggested Reading:

1. Headfirst Python. Paul Barry, 2nd edition.
2. Python Programming. John M Zelle, 3rd edition.
3. Think Python: How to Think Like a Computer Scientist. Allen B. Downey, 2nd edition.

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			End Sem University	Two Term Exam	Teacher Assessment*	End Sem University exam	Teacher Assessment*				
BSDFN403	Compulsory	Cryptography and Network Security	60	20	20	30	20	4	0	2	5

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COURSE OBJECTIVES

The student will have ability to:

1. To know Cryptography and its significances.
2. To know significance of Network security.

COURSE OUTCOMES

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

1. To understand cryptography
2. To understand network security.
3. To understand network forensics.

SYLLABUS

Unit-I

Introduction to cryptography. Terminologies used in Cryptography. Substitution Techniques – The Caesar Cipher, One-Time Pads, The Vernam Cipher, Book Cipher.
 Transposition Techniques– Encipherment/Decipherment Complexity, Digrams, Trigrams, and Other Patterns.

Unit-II

Types of Encryption Systems – Based on Key, Based on Block; Confusion and Diffusion; Cryptanalysis.
 Characteristics of Good Encryption Technique; Properties of Trustworthy Encryption Systems.

Unit-III

Introduction to Data Encryption Standard (DES) Algorithm. Double and Triple DES – Double DES, Triple DES; Security of the DES. Overview of Advanced Encryption Standard (AES) Algorithm.

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Unit-IV

Overview of public key system. Characteristics of Public Key System. RSA Technique, Encryption-Method, Key Exchange, Diffie-Hellman Scheme, Cryptographic Hash Functions. Overview of Digital Signature, Public Key Protocol, Certificates, Certificate Authorities.

Unit-V

Introduction to Network Security. Network Concepts: Threats in Networks – Who Attacks Networks? Threats in Transit: Eavesdropping and Wiretapping, Protocol Flaws, Impersonation; Network Security Controls.

List of Practical:

1. Encryption and Decryption
2. RSA Technique – Encryption-Method
3. Network tracking demo
4. Any other practical/ visit may be conducted based on the syllabus.

Suggested Reading:

1. Cryptography and Network Security - Principles and Practice, Seventh Edition, by Pearson.
2. Hands-on Penetration Testing for Web Applications by Richa Gupta.
3. Computer Security- Principles and Practice, Fourth Edition by Pearson.
4. Cyber Security by Neha Godbole.

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BSDFN404	Computer Networks	Computer Networks	60	20	20	30	20	4	0	2	5

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COURSE OBJECTIVES

The student will have ability to:

1. Understand the concepts of networking.
2. Describe the various networking architectures.
3. Identify the protocols and services of different layers.

COURSE OUTCOMES

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

1. Understand the concepts of networking.
2. Describe the various networking architectures.
3. Identify the protocols and services of different layers.
4. Distinguish the basic network configurations and standards associated with each network.

SYLLABUS

Unit-I

Data communication: Components, Data representation, Data flow, Networks: Network criteria, Physical Structures, Network types: LAN, WAN, Switching, The Internet.

Unit-II

Protocol Layering: Scenarios, Principles, Logical Connections, TCP/IP Protocol Suite: Layered Architecture, Layers in TCP/IP suite, Description of layers, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model: OSI Versus TCP/IP.

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Unit-III

Nodes and Links, Services, 1\\voCategories' of link, Sublayers, Link Layer addressing: Types of addresses, ARP. Data Link Control (DLC) services: Framing, Flow and Error Control, Data Link Layer Protocols: Simple Protocol, Stop and Wait protocol, Piggybacking.

Unit-IV

Network Layer services: Packetizing, Routing and Forwarding, Other services, Packet Switching: Datagram Approach, Virtual Circuit Approach, IPV4 Addresses: Address Space, Classful Addressing, Classless Addressing, DHCP, Network Address Resolution, Forwarding of IP Packets: Based on destination Address and Label.

Unit-V

providing services, Application- layer paradigms, Standard Client -Server Protocols: World wide web, Hyper Text Transfer Protocol, FTP: Two connections, Control Connection, Data Connection, Electronic Mail: Architecture, Wed Based Mail, Telnet: Local versus remote logging. Domain Name system: Name space, DNS in internet, Resolution, DNS Messages, Registrars, DDNS, security of DNS.

List of Practical:

1. Study different network devices.
2. Study basic network command and network configuration command.
3. Implement concept of VLAN.
4. Implement concept of static routing.
5. Implement concept of dynamic routing.
6. Packet capture and header analysis.

Suggested Reading:

1. James J Kurose, Keith W Ross, "Computer Networks", Pearson Education.
2. Wayne Tomasi, "Introduction to Data Communication and Networking", Pearson Education.
3. Andrew S Tanenbaum, "Computer Networks", Prentice Hall.
4. William Stallings, "Data and Computer Communications", Prentice Hall.

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