Shram Sadhana Bombay Trust's

College of Engineering & Technology, Bambhori, Jalgaon

Syllabus for Certificate Course in "Cyber Security"

Paper-I: Network and Security **(Total 90 Hrs)**

1. Introduction to Networks: - **(18 Hrs.)**

Intranet, Local Area Network, Wide Area Network, Metropolitan Area Network, Networks, Topologies, Internet, World Wide Web.

Data Communications: Basics of Data Communication: Characteristics and Components, Data Representation and Data Flow Networks, Introduction to ISO-OSI Reference model

Error Control and Data Link Control: Types of errors, Block coding, Linear block codes,Cyclic codes, Checksum, Flow and error control.

2. Network Models: **(18 Hrs.)**

Layered Task, TCP/TP Protocol Suite, Addressing: Physical Addresses, Logical Addresses, Port Addresses, and Specific Addresses.

Data Link Layer: Framing, Flow and Error Control

Wired LANs Ethernet: IEEE Standards, Standard Ethernet, 802.3 MAC Frame Format Changes in the standard Ethernet

Logical Addressing:

IPv4 Addresses: Address Space, Notations, Classful Addressing,
Classless Addressing, Gateways, DNS, Network Address Translation (NAT).

3. Internet Protocol: **(18 Hrs.)**

IPv4: Datagram, Fragmentation, Checksum, Options. IPv6: Structure, Address Space, Advantages, Packet Format, Extension Headers, Transition from IPv4 to IPv6: Dual Stack, Tunneling, Header Translation.

Address Mapping: Mapping Logical to Physical Address: ARP, Mapping Physical to Logical Address: RARP, BOOTP and DHCP.

Error Reporting: ICMP: Types of Messages, Message Format, Error Reporting Messages, Query Massages, Ping and Traceroute Debugging Tools.

Delivery: Direct Versus Indirect Delivery.

Forwarding: Forwarding Techniques, Routing Table.

Unicast Routing Protocols: Intra and Interdomain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP

4. Transport Layer: **(18 Hrs.)**

Transport-layer services: Process-to-Process Communication,
Addressing: Port Numbers, Encapsulation and Decapsulation, Multiplexing and Demultiplexing, Flow Control and Error Control.

User Datagram Protocol (UDP): User Datagram, UDP Operation, Uses of UDP

Transmission Control Protocol (TCP): TCP Services, TCP Features, TCP Segment, TCP Connection, Flow Control, Error Control and Congestion Control: open-loop congestion control and closed-loop congestion control techniques.

5. Network Security:
Introduction: **(18 Hrs.)**

Network security methods:-Access control, Anti-malware Application security Behavioral analytics Data loss prevention Email security Firewalls Intrusion detection and prevention Mobile device and wireless security Network segmentation VPN Web security, **Introduction to cryptography**, symmetric-key and asymmetric key Cryptography, XOR Cryptography and RSA cryptography

Introduction to Wireless Network: Advantages and Disadvantages of Wireless Networks

Overview of 802.11 Wireless Networks: IEEE 802 Network Technology Family Tree, 802.11, Nomenclature and Design, Types of Wireless Networks, 802.11 Network Operations, 802.11 frame format, Wireless TCP, Mobility Support.

Text Books:-

1. B. A. Forouzan, "Data Communications and Networking", TMH, Fourth Edition.
2. Matthew S. Gast, "802.11 Wireless Networks: The Definitive Guide", O'Reilly, Second Edition.

Reference Books:-

1. B.A. Forouzan and FirouzMosharraf, "Computer Networks: A Top Down Approach", TMH, 2018.
2. A. S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition
3. S. Keshav, "An Engineering Approach to Computer Networking", Addison Wesley.
4. Mayank Dave, "Computer Networks", Cengage Learning India, First edition, 2012
4. BhavneetSidhu, "An Integrated Approach to Computer Networks", Khanna Publications.
6. Comer, "Internetworking with TCP/IP", Vol. 1, Pearson Education, Fourth Edition.
7. W. Stallings, "Data and Computer Communications", Pearson Education, Fifth Edition.
8. B. A. Forouzan, "TCP/IP Protocol Suite", TMH, Fourth Edition.

Coordinator

Head,
Department of Computer Engineering

Head
Computer Engineering Department
SNBT's College of Engineering & Technology
Sangamner-422001(M.S.)

Shram Sadhana Bombay Trust's

College of Engineering & Technology, Bambhori, Jalgaon

Syllabus for Certificate Course in "Cyber Security"

Paper-II: "Cyber Security" **(Total 90 Hrs)**

1. Introduction to Cybercrime: **(18 Hrs.)**

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals?, Classifications of Cybercrimes, Objective and Scope of the IT act 2000, ISP Guideline, Intellectual Property Issues, Overview of Intellectual Property Related Legislation in India

E-Commerce in India, Scope of E-Commerce in India, Specifying Guidelines to Enter E-Marketplace, E-Agreement, Legal Recognition of Electronic and Digital Records, Legal Recognition of Digital Signatures

2. Cyber offenses: How Criminals Plan Them: **(18 Hrs.)**

Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cybercafé and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile device related security issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops

3. Tools and Methods Used in Cybercrime: **(18 Hrs.)**

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.

Ethical Issues in Data and Software Privacy: Plagiarism, Pornography, Tampering Computer Documents/System Hacking, Data Privacy and Protection, Software Privacy, Social Engineering and Fishing, Types of Social Engineering, Exploring Methods of Phishing, Issues in Ethical Hacking, Cyber Crime Forensic

4. Physical Security: **(18 Hrs.)**

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

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft)

Understanding Computer Forensics: Introduction, Historical Background of Cyber-forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber-forensics and Digital Evidence, Forensics Analysis of E-Mail

5. Computer Forensics: **(18 Hrs.)**

Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the

OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Anti-forensics

Text Book

1. Nina Godbole and Sunil Belapure, "Cyber Security", Wiley India Publication, 2014
2. FaiyazAhamad, "Cyber Law and Information Security", Dreamtech Press

Reference Books

1. Nina Godbole , Information Systems Security , Wiley India Publication
2. V.K. Pachghare, Cryptography and Information security, PHI, Second edition

Coordinator

Head,
Department of Computer Engineering

Head
Computer Engineering Department
SSBT's College of Engineering & Technology
Bambhori,Jalgaon-425001(M.S.)

Shram Sadhana Bombay Trust's

College of Engineering & Technology, Bambhori, Jalgaon

Syllabus for Certificate Course in "Cyber Security"

Paper-III: Network and Security Lab **(Total 120 Hrs.)**

Students should perform lab assignments prescribed as below

Group A: - all compulsory

Group B: - any two

Group C: - 1, 2 compulsory, any 4 from 3

Lab Assignments;-

Group A

1. Comparative analysis of different types of network cables with Specifications
- Study of different types of Network cables – CAT-5, CAT – 6.
- Study of different cable specifications comparisons.
2. Network related commands such as ARP, IPCONFIG, PING, TRACERT, NSLOOKUP, GETMAC, NETSTAT etc.
   - Practical use of Network commands ARP
   - Study of IPCONFIG for IP configurations
   - Study of PING command for finding destination reachable or not.
   - Study of TRACERT command
   - Study of NSLOOKUP command
   - Study of GETMAC to get MAC address.
   - Study of NETSTAT to get the network status.

3. I.T Infrastructure planning using Network Connecting Devices.
   - Consider our own college as a case & prepare a planning for I.T. infrastructure.
4. Network Connecting Devices Specifications and configurations.
   - Practical study of Network Connecting device – Repeater.
   - Practical study of Network Connecting device – Switch /HUB.
   - Practical study of Network Connecting device – Router
5. Crimping of cross-wire and straight-through UTP cable to inter-connect two computers.
   - Study of crimping tool.
   - Study of colour coding of Network cables.
   - Crimping the cable using Crimping Tool
   - Test the crimping by interconnecting two computers
6. Interconnections of computers in Local Area Network to share resources.
   - Study of concept of LAN & Shared resources.
   - Interconnect computers in LAN
   - Share and make the use of shared resources.

Group B

1. Configuring DHCP, DNS and HTTP Server.
2. Configuring Routing.
3. Study of Packet Tracer.

Group C

Note: - Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of the concern subject.

1. Study of Information Technology Act – Indian Perspective.
2. Study of recent Cyber Incidents / Vulnerability.
3. Concerned faculty member should suitably frame Four Laboratory assignments with hands-on based on following tools but not limited to:
   - Security Testing Tools for Web Applications
     - Tools to Scan Website Security Vulnerabilities & Malware
     - Security tools for online protection
     - Check if your password is strong
     - Social Media Security
     - Safe Browsing
     - Backup
     - Reporting to government organizations or cyber security companies
   - Networking & Security Auditing Tools
     - Offensive Cyber Security Tools
     - Breach Discovery
     - Internet Security
     - Email Security
     - Cyber Security Frameworks & Operating Systems
     - Vulnerability Scanning Tools
     - Password Management, Recovery & Attack Tools
   - Defensive Cyber Security Tools
     - Open source firewall
     - Security Information and Event Management (SIEM) solution
     - Open Source Intelligence (OSINT) Tools
   - Open Web Application Security Project (OWASP)

Coordinator

Head,
Department of Computer Engineering

Head
Computer Engineering Department
SSBT's College of Engineering & Technology
Bambhori,Jalgaon-425001(M.S.)

CERTIFICATE COURSE IN "CYBER SECURITY"

Objectives:-

1. To understand the basics concepts of data communication and networking.
2. To understand IP addressing and internet protocol.
3. To understand process to process communication using TCP and UDP.
4. To understand network security and wireless networking concepts with wireless TCP.
5. To understand Cybercrime and Cyber offenses.
6. To understand Cybercrime through portable devices.
7. To understand tools and methods used in Cybercrime.
8. To understand Phishing and Identity theft.
9. To understand Computer Forensics.

Duration of the Course : 01 Year

Structure of the Course -

Paper-I	:	Network and Security
Paper-II	:	Cyber Security
Paper-III	:	Network and Security Lab
Eligibility	:	Students should be admitted to the college for first year degree course.
Intake	:	Maximum of enrolment for every course will be 60 Students.
Nature of Examination	:	Annual

The examination for the course will be

1) Theory Examination (External Valuation) : 60 Marks for every paper
2) Test, Tutorial, Seminar, Home Assignment, Group Discussion (External Valuation) : 40 Marks for every paper
3) Practical Examination (Project Work, Viva-Voce, Interview Tour & Lab Visit, Presentation) : 100 Marks

Credits for Certificate Course:

The course will carry 20 credits, each credit will have 15 hours of workload, out of which, and 8 credits should necessarily be assigned to practical field work / project work / training. The proof relating should be submitted during examination i.e work experience certificate / dissertation / report etc duly issued and signed by the concerned institutional authority / coordination / faculty.

Coordinator

Head,
Department of Computer Engineering

Head
Computer Engineering Department
SSBT's College of Engineering & Technology
Bambhori, Jalgaon - 425001 (M.S.)