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35242 – COMPUTER NETWORKS AND SECURITY

DETAILED SYLLABUS

UNIT I DATA COMMUNICATIONS

1.1 **Data Communication:** Components of a data communication – Data flow: Simplex - Halfduplex – Full duplex; Networks – Network criteria – Types of Connections: Point topoint – multipoint; Topologies: Star, Bus, Ring, Mesh, Hybrid – Advantages andDisadvantages of each topology

1.2. **Types of Networks:** Need for computer Networks **-** LAN – MAN – WAN – CAN – HAN –Internet – Intranet – Extranet , Client-Server, Peer to Peer Networks.

1.3 **Transmission Media** : Characteristics of Transmission Media – Classification oftransmission media - Guided – Twisted pair – Coaxial – Fiber optics – Unguided – Radiowaves – Infrared – Low Orbit satellite (LOS) – VSAT – Cabling and Standards

1.4. **Network devices:** Features and Concepts of Switches – Routers (Wired and Wireless) –Gateways.

UNIT II OSI MODEL AND LAN PROTOCOLS

2.1. **Network Models:**Protocol definition - Standards - OSI Model – Layered architecture Functions of all layers.

2.2. **802.X Protocols :** Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) –Token ring (802.5) – Ethernet – Types of Ethernet (Fast Ethernet, gigabit Ethernet) Comparison between 802.3, 802.4 and 802.5

2.3. **FDDI:** Frame format – Advantages and disadvantages of FDDI. 2 Hrs

2.4 **Switching:** Definition **–** Circuit switching – Packet switching – Message switching.

2.5 **I S DN** : Concepts – Services – Broad Band ISDN 1Hrs

UNIT III TCP/IP SUIT

3.1. **Overview of TCP / IP:** OSI & TCP/IP – Transport Layer Protocol– Connection Orientedand Connectionless Services – Sockets - TCP & UDP.

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3.2. **Network Layers Protocol:** IP – Interior Gateway Protocols (IGMP, ICMP, ARP, RARPConcept only).

3.3. **IP Addressing :** Dotted Decimal Notation –Subnetting & Supernetting – VLSM Technique-IPv6 (concepts only)

3.4 **Application Layer Protocols:** FTP– Telnet – SMTP– HTTP – DNS – POP. 2 Hrs

UNIT IV NETWORK SECURITY

4.1. Introduction to Network security: Definition – Need for security – Principles of Security – Attacks – Types of Attacks – Criminal attacks – Legal Attacks – Passive and Activeattacks – Security Services – Security Mechanisms .

4.2. Cryptography: Definition – Symmetric Encryption principles – Symmetric BlockEncryption Algorithms – DES, AES – Stream ciphers – RC4 – Digest function – Public key Cryptography Principles–RSA-Diffe-Hellmanalgorithm– Digital Signature(Definitiononly)

4.3**.** Network Security Application: Authentication applications – Kerberos (concepts only) - Overview- Motivation –Encryption Techniques;

4.4. Internet Security: Email security – PGP - S/MIME - IP security – Overview – IP Security Architecture - Web security - SSL, TLS ,SET (Concepts only)

UNIT – V APPLICATIONS OF NETWORK SECURITY

5.1 Introduction to network security : Definition and Basic concepts-Basic concepts ofRAID levels(0,1,2,3,4,5).

5.2 Hackers Techniques: Historical hacking techniques & open sharing-Bad Passwords- Advanced Techniques- Viruses-worms-Trojan horses-SPAM

5.3 Security Mechanism : Introduction – Types of Firewalls – Packet filters – Application gate ways – Limitations of firewalls.

5.4 Intrusion: Intruders– Intruder detection – Classification of Intruder Detection systems Honey pots.

5.5 Wireless Security Issues: Definition and Types -Transmission Security, Authentication ,WLAN Detection, Eaves Dropping, Active Attacks, WEP Definition and Features.

Text Book:

1. Data Communication and networking Behrouz A.Forouzen TataMcGraw- Hill,New Delhi Fifth Edition
2. Network Security Essentials William Stallings Pearson Publications. Fifth Edition
3. CRYPTOGRAPHY AND NETWORK SECURITY William Stallings Pearson Publications. Sixth Edition