Computer Science Paper-II
Computer Networks-II
[Discipline Specific Course]

Semester: V	Credits: 2	Subject Code: BS52202	Lectures: 36

Course Outcomes:

At the end of this course, the learner will be able to:

- Illustrate different Application layer protocols
- Explore technical aspects of multimedia system
- Compare and contrast different cryptographic techniques for data security
- Explore different internet security protocols

Unit 1: Application Layer	**10**
• Domain Name Space ○ Name space-Flat name space, Hierarchical name space Domain Name Space -Label ,Domain name, FQDN,PQDN ○ Distribution of Domain Name Space-Hierarchy of name servers, zone, root server, Primary and secondary servers. ○ DNS in the Internet: Generic domains, Country domains, inverse domain ○ Resolution-Resolver, mapping names to address, mapping addresses to names, recursive resolution, iterative resolution, caching • Electronic Mail(E-Mail) ○ Architecture-First scenario, second scenario, Third scenario, Fourth scenario ○ User agent-services of user agent, types of UA Format of e-mail ○ MIME-MIME header ○ Message transfer agent-SMTP ○ Message Access Agent: POP and IMAP • File Transfer ○ FTP-Communication over data control connection, File type, data structure, Transmission mode, anonymous FTP	

Unit 2: Multimedia	**8**
• Digitizing audio and video, Audio and Video compression • Streaming Stored audio/video ○ First approach ○ Second approach ○ Third approach ○ Fourth approach • Streaming live audio/video • Real time interactive audio/video- Characteristics, Time relationship, timestamp, Playback buffer, ordering multicasting, translation	

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• RTP-Packet format • RTCP-Message types • Voice over IP-SIP,SIP session H.323-Architecture, Protocols	

Unit 3: Cryptography and Network Security	**9**

• Terminology: Cryptography, plain text and cipher text, cipher key, categories of cryptography-Symmetric key, asymmetric key
• Encryption model
• Symmetric key cryptography
  ○ Traditional ciphers – substitution cipher, shift cipher, Transposition cipher
  ○ Simple Modern ciphers-XOR, Rotation cipher, s-box,p-box Modern round ciphers-DES
  ○ Mode of operation-ECB,CBC,CFB,OFB
• Asymmetric key cryptography-RSA
  ○ Security Services Message confidentiality-With Symmetric key cryptography, with asymmetric key cryptography
  ○ Message integrity-Document and fingerprint, message and message digest
  ○ Message authentication-MAC,HMAC
  ○ Digital signature
  ○ Entity Authentication-Passwords, Fixed passwords challenge-response	

Unit 4: Security in the Internet	**9**

• IP Security(IPSec)
  ○ Two modes
  ○ Two security protocols
  ○ Services provided by IPSec
  ○ Security association
  ○ Internet key exchange
  ○ Virtual private network
• SSL/TLS
  ○ SSL services
  ○ Security parameters
  ○ Sessions and connections
  ○ Four protocols
  ○ Transport layer security
• PGP
  ○ Security parameters
  ○ Services
  ○ PGP algorithms
  ○ Key rings
  ○ PGP certificates
• Firewalls
  ○ Packet filter firewall
  ○ Proxy firewall	

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Recommended Reference Books:

- Forouzan Behrouz, E(2017). *Data Communication & Computer Networks*. Tata McGraw Hill Publications.
- Stallings, W. (2006). *Cryptography and network security principles and practices* 4th edition.Pearson Education.
- Stallings, W. (2003). *Network Security Essentials: Applications and Standards, 4/e*. Pearson Education India.
- Tanenbaum, A. S., & Wetherall, D. (1996). *Computer networks*. Prentice-Hall international editions.

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