



**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

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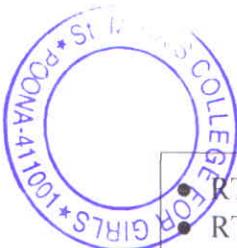
- Domain Name Space
 - Name space-Flat name space, Hierarchical name space
Domain Name Space -Label ,Domain name, FQDN,PQDN
 - Distribution of Domain Name Space-Hierarchy of name servers, zone, root server, Primary and secondary servers.
 - DNS in the Internet: Generic domains, Country domains, inverse 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

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- 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

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- 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

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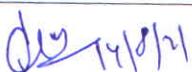
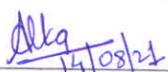
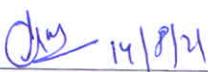
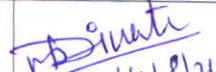
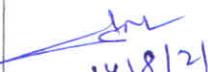
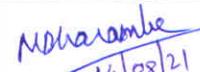
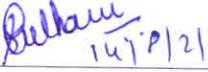
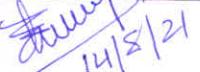
- IP Security(IPSec)
 - Two modes
 - Two security protocols
 - Services provided by IPSec
 - Security association
 - Internet key exchange
 - Virtual private network
- SSL/TLS
 - SSL services
 - Security parameters
 - Sessions and connections
 - Four protocols
 - Transport layer security
- PGP
 - Security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

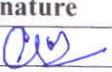
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Recommended Reference Books:

- 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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