

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

Semester: V	Credits: 2	Subject Code: BS52202	Lectures: 36
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Course Outcomes:
<p>At the end of this course, the learner will be able to:</p> <ul style="list-style-type: none"> ● 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
<ul style="list-style-type: none"> ● Domain Name Space <ul style="list-style-type: none"> ○ 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) <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ FTP-Communication over data control connection, File type, data structure, Transmission mode, anonymous FTP 	

Unit 2: Multimedia	8
<ul style="list-style-type: none"> ● Digitizing audio and video, Audio and Video compression ● Streaming Stored audio/video <ul style="list-style-type: none"> ○ 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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<ul style="list-style-type: none"> ● RTP-Packet format ● RTCP-Message types ● Voice over IP-SIP, SIP session H.323-Architecture, Protocols 	
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Unit 3: Cryptography and Network Security	9
<ul style="list-style-type: none"> ● Terminology: Cryptography, plain text and cipher text, cipher key, categories of cryptography-Symmetric key, asymmetric key ● Encryption model ● Symmetric key cryptography <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ 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 	



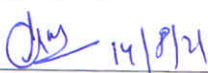
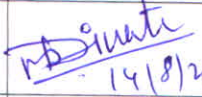
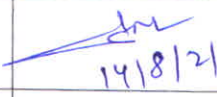
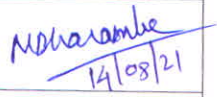
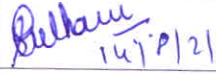
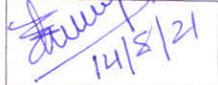
Unit 4: Security in the Internet	9
<ul style="list-style-type: none"> ● IP Security(IPSec) <ul style="list-style-type: none"> ○ Two modes ○ Two security protocols ○ Services provided by IPSec ○ Security association ○ Internet key exchange ○ Virtual private network ● SSL/TLS <ul style="list-style-type: none"> ○ SSL services ○ Security parameters ○ Sessions and connections ○ Four protocols ○ Transport layer security ● PGP <ul style="list-style-type: none"> ○ Security parameters ○ Services ○ PGP algorithms ○ Key rings ○ PGP certificates ● Firewalls <ul style="list-style-type: none"> ○ 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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