



B. Tech. in COMPUTER SCIENCE AND ENGINEERING

III Year I Semester Syllabus (KR23)

COMPUTER NETWORKS (23CS504PC)

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Pre-requisites:

1. 23CC403PC - Operating Systems.

Course Objectives: The course will help to

1. Learn the basic concepts of computer networks.
2. Gain knowledge on Framing, Error – Detection and Correction and Data link layer Protocols.
3. Gain the knowledge on network layer subnetting and routing algorithms.
4. Understand the TCP, UDP protocols, and various Application layer protocols.
5. Understand the basic categories of threats to computers and networks.

Course Outcomes: After learning the concepts of this course, the student can

1. Understand basic computer network technology and the functions of each layer in OSI and TCP/IP model.
2. Examine various data link layer design issues and data link protocols.
3. Interpret network layer and routing algorithms for desired communication
4. Understand transport and application layer protocols, connection control, congestion control, QoS techniques.
5. Understand security principles, attack types, security mechanisms, and cryptographic techniques for secure communication.

UNIT – I

Data Communications: Components –Direction of Data flow –Networks –Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, TCP-IP Model.

Physical layer: Transmission modes, Multiplexing, Transmission Media- Guided Transmission Media, Unguided Transmission Media.

Data link layer: Introduction, Framing and Error–Detection and Correction–Hamming code, CRC, Checksum.

UNIT – II

Flow and Error Control: Noiseless Channels- Simplex, Simplex-Stop and Wait Protocol, Noisy Channels- Stop and Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ. Medium Access sub layer: Multiple Access Protocols- Random Access Protocols- ALOHA, CSMA/CD, CSMA/CA, LAN, Ethernet IEEE 802.3.

UNIT – III

Network layer: Logical Addressing- IPV4- Classful and Classless Addressing, Subnetting, NAT, IPV6Addressing.

Internetworking- Tunneling, Address mapping- ARP, RARP, Bootp, DHCP, ICMP, IGMP.

Routing –Distance Vector Routing, Link State Routing, Shortest path routing.

UNIT – IV

Transport Layer: Process to Process Delivery, UDP and TCP protocols, TCP Connection Control, Congestion Control-Types, Quality of Service (QoS), QoS Techniques - Leaky Bucket and Token Bucket algorithms.

Application Layer: Domain name space, Remote Logging-Telnet, Electronic mail, SMTP, FTP, WWW, HTTP,SNMP.

UNIT – V

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security.

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography.

TEXT BOOKS:

1. Data Communications and Networking-Behrouz A. Forouzan, Fourth Edition TMH,2006.
2. Computer Networks- Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.
3. Cryptography and Network Security-Principles and Practice: William Stallings, Pearson Education, 6th Edition
4. Cryptography and Network Security: Atul Kahate, McGrawHill,3rdEdition.

REFERENCE BOOKS:

1. Data communications and Computer Networks- P.C Gupta,PHI.
2. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks- W.A. Shay, Cengage Learning 3rd Edition.
4. Data and Computer Communication-William Stallings, Pearson Education,6thEdition ,2000.
5. Cryptography and Network Security: Forouzan, Mukhopadhyay, McGrawHill,3rdEdition
6. Information Security, Principles, and Practice: Mark Stamp, Wiley India.