

MEC2009 COMPUTER COMMUNICATION NETWORKS

Module 1

Local Area Networks:

Background, Topologies and Transmission Media, LAN standards IEEE 802 Reference Model, Logical Link Control, Medium Access Control, IEEE 802.3 Medium Access Control, Ethernet, Bridged Ethernet and Switched Ethernet, Fast Ethernet, Gigabit Ethernet, Token Ring and FDDI, IEEE 802.5 Transmission Medium Options. Fiber Channel Elements, Fiber Channel Protocol Architecture, Fiber Channel Physical Media and Topologies.

Text Books:

1. Data and Computer Communication. 7/E by William Stallings.
2. Data Communication and Networking. 3/E by Behrouz A. Forouzan.
3. Communication Networks. 2/E by Alberto Leon-Garcia & Indra Widjaja.

Module 2

Connecting devices and Backbone Networks:

Bridges, Functions of a Bridge, Bridge Protocol Architecture, Fixed routing, Spanning tree approach, Connecting devices like Repeaters, Hubs, Bridges, Two layer switches, Transparent Bridges, Source Routing Bridges, Merced-Media Bridges, Virtual LANs, Router and Three layer switches, Backbone Networks, Bus Backbone, Star Backbone, Connecting Remote LANs, Wireless LANs, Applications, IEEE 802.11, Architecture and Services, Medium Access Control, Physical layer.

Text Books:

1. Data and Computer Communication. 7/E by William Stallings.
2. Data Communication and Networking. 3/E by Behrouz A. Forouzan.
3. Communication Network 2/E by Alberto Leon-Garcia & Indra Widjaja.

Module 3

Internetworking:

Principle, Requirements, Architectural approaches, Connectionless Internetworking, Routing techniques, Dynamic routing, Internet Protocol (IP), Internal Control Message Protocol (ICMP), IPV6 structure, Address and Header Formats, ICMPV6, Unicast and Multicast Routing, Autonomous Systems, Unicast Routing Protocol OSPF, Internet Group Management Protocol (IGMP), Border Gateway Protocol.

Text Books:

1. Data and Computer Communication. 7/E by William Stallings.
2. Data Communication and Networking. 3/E by Behrouz A. Forouzan.
3. Communication Network. 2/E by Alberto Leon-Garcia & Indra Widjaja.

Module 4

Transport Protocols:

Connection Oriented Transport Protocol Mechanisms, Reliable Sequencing Networks Services, Unreliable Network Services, TCP Services, TCP Header format, TCP Mechanisms, TCP Implementation Policy options, TCP Congestion Control, Retransmission Timer Management, Window Management, Quality of service, User Datagram Protocol (UDP).

Text Books:

1. Data and Computer Communication. 7/E by William Stallings.
2. Data Communication and Networking. 3/E by Behrouz A. Forouzan.

Module 5

Network Security:

Passive and Active Attacks, Symmetric Encryption, Encryption Algorithms, Key distribution, Traffic padding, Message Authentication, Hash function, Secure Hash function, Public-key Encryption, Digital Signature, RSA Public key Encryption Algorithm, Key Management, Secure Socket layer and Transport layer Security, SSL Architecture, SSL Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Handshake Protocol, IP level Security IPSEC, Application layer Security PGP, Firewall, Virtual Private Networks.

Text Books:

1. Data and Computer Communication. 7/E by William Stallings.
2. Data Communication and Networking. 3/E by Behrouz A. Forouzan.

Module 6

Distributed Applications:

Electronic Mail, Simple Mail Transfer Protocol (SMTP), Multipurpose Internet Mail Extension (MIME), Client Server Model, Socket Interface, Socket Programming, File Transfer, Simple Network Management Protocol (SNMP), SNMP V₂ and SNMP V₃, Hypertext Transfer Protocol (HTTP) overview , Message Entities, World Wide Web (WWW), HTML, Common Gateway Interface (CGI).

Text Books:

1. Data and Computer Communication .7/E by William Stallings.
2. Data Communication and Networking .3/E by Behrouz A. Forouzan.

Module 7

Advanced Network Architectures:

Integrated Services in Internet, Resource Reservation Protocol (RSVP), Receiver initiated Reservation, Reservation Merging, RSVP Message format, Differentiated Services , DS field , Network Interconnection Models, Overlay Model, Peer-to-Peer Model, Multi-protocol Label Switching (MPLS) , Generalized MPLS (GMPLS), Real-Time Transport Protocols (RTP), RTP Control Protocol, Session Control Protocols, Session Initiation Protocol.

Text Book:

Communication Network. 2/E by Alberto Leon-Garcia & Indra Widjaja