COMPUTER NETWORKS
EE-705A
Credit: 3
Contact: 3L

Module 1
Overview of Data Communication and Networking:
Introduction, Data communications: components, data representation (ASCII, ISO etc.), direction of data flow (simplex, half duplex, full duplex); network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN,WAN); Internet: brief history, Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

Physical Level:
Overview of data (analog & digital), signal (analog & digital), transmission (analog & digital) & transmission media (guided & unguided); Circuit Switching: time division & space division switch, TDM bus; Telephone Network. [10]

Module 2
Data link Layer:
Types of errors, framing (character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back-N ARQ, Selective repeat ARQ, HDLC;]

Medium Access sub layer:
Point to Point Protocol, LCP, NCP, Token Ring; Reservation, Polling, Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA Traditional Ethernet, fast Ethernet (in brief). [10]

Module 3
Network layer:
Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : IP addressing, sub netting; Routing : techniques, static vs. dynamic routing , Unicast Routing Protocols: RIP, OSPF, BGP; Other Procols: ARP, IP, ICMP, IPV6.

Transport layer:
Process to Process delivery; UDP; TCP; Congestion Control: Open Loop, Closed Loop choke packets; Quality of service: techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm, [12]

Module 4
Application Layer:
Introduction to DNS, SMTP, SNMP, FTP, HTTP & WWW; Security: Cryptography (Public, Private Key based), Digital Signature, Firewalls.

Modern topics:
ISDN services & ATM, DSL technology, Cable Modem: Architecture and operation in brief. Wireless LAN: IEEE 802.11, Introduction to blue-tooth. [08]

Numerical problems to be solved in the class.

Text Books:
1. Data Communications and Networking (3rd Ed.), A. Forouzan , TMH
2. Computer Networks (4th Ed.), A. S. Tanenbaum, Pearson Education/PHI
3. Data and Computer Communications (5th Ed.), W. Stallings, PHI/ Pearson Education

Reference Books:
1. Computer Networking -A top down approach featuring the internet, Kurose and Rose Pearson Education
2. Communication Networks, Leon, Garica, Widjaja, TMH
3. Communication Networks, Walrand, TMH.
4. Internetworking with TCP/IP, vol. 1, 2, 3(4th Ed.), Comer, Pearson Education/PHI