DATA COMMUNICATION

	Lecture No
Data Communications	1
Introduction, Communication Systems, Signal and data, Transmission modes,	
Synchronous and asynchronous transmission, Circuits, channels and multichannelin	g,
Signaling, Encoding and decoding	
Error detection and Recovery, Flow control, Sliding Window, Congestion	2-3
Management, Multiplexing [FDM, TDM, CDM, WDM] and Spreading	
[DS. FH], Concept of Modulation, Baseband versus Broadband; Pulse Code	
Modulation (PCM)	
Shift Keying [ASK, FSK, PSK, QPSK, DPSK]; Encoding techniques and CODEC;	4-5
Classification of Modems, Standards and Protocols, Protocols used by Modem to	
Transfer files, Establishing a Connection (Internet connectivity); Digital Subscriber	
Loop (DSL)	
Communication Network Fundamentals	
Introduction, Switching techniques: Circuit Switching, Packet switching, Datagram,	6
Virtual circuit and Permanent Virtual Circuit,	
Connectionless and connection oriented communication, Message switching, Cell	7
switching (ATM); Telephone network signaling Network topologies, Layering the	
communication process,	
Open Systems Interconnection (OSI) model, Data encapsulation; Protocols, services	8-9
and layering, PDU/SDU; TCP/IP suite, Hour-glass model, Internet Architecture and	
Protocol overview.	
Media Access Control	10
Introduction, Access Techniques (STDM, FDMA, TDMA, Spread Spectrum	
techniques and CDMA, DSSS, FHSS);	
Media Access Control: Aloha and Slotted Aloha, Media Access Control Address,	11-12
Polling, CSMA, CSMA/CA, CSMA/CD and Reservation Aloha, Digital hierarchies	
[SONET/SDH]	
Network Components	
Introduction, LAN Hardware, LAN Operating Systems, Transmission Media: Guided	13-14
Media (Twisted pair, Co-axial cable, Optical fiber);	
Unguided Media (Radio, VHF, microwave, satellite, Infrared); Fiber Optics	15-16
Communication Components (Source, Channel Detector)	
Link Control and MAC Protocols	
Framing, Error Detection and Correction; Window-based Flow Control; Logical Link	17-18
Control, HDLC Protocol, Point-to-Point Protocol (PPP)	
X.25 CCITT standard for packet data transmission; Media access control, Random	19-20
Access Techniques, Scheduling Mechanisms.	
Local Area Network (LAN)	
LAN topologies and protocols; IEEE 802 Standard; Ethernet (Standard, Fast, Gigabit), 21-22
Token Ring, FDDI	,,
Wireless LANs (802.11x); Connecting LANs: Repeaters, Bridges, Switches, Routers	23-24
Virtual LANs	, -5 - .

Wide Area Network (WAN)	
Network Layer Addressing and Routing concepts (Forwarding Function, Filtering	25-26
Function); Routing Methods (Static and dynamic routing, Distributed routing,	
Hierarchical Routing);	
Distance Vector Protocol, Link State protocol, Open Shortest Path First (OSPF);	27-28
Internet Protocol (IP): Addressing & Routing; Internet Control Message Protocol,	
(ICMP), Address Resolution Protocol (ARP), Dynamic Host Control Protocol	
(DHCP),	
Network Address Translation (NAT), IPv6, Mobile IP Process-to-Process delivery in	29-30
Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol	
(TCP), congestion control	
Application Protocols	31
Client/Server Model, Network File System (NFS), Remote Login: Telnet; File	
Transfer Protocol (FTP),	
Trivial File Transfer Protocol (TFTP); E-mail system: Simple Mail Transfer Protocol	32
(SMTP), Post Office Protocol (POP); World Wide Web (WWW),	
Domain Name System (DNS), DNS servers; Hyper Text system: Hyper Text Transfer	33-34
Protocol (HTTP), Hyper Text markup Language (HTML)	
Wireless Networks	35-36
Radio Communications, Cellular Radio, Mobile Telephony (GSM & CDMA),	
Satellite Networks (VSAT), Mobile Adhoc Networks (MANET).	
Security and Management	37-38
Cryptography, IPsec, SSL/TLS, PGP, secure HTTP	
proxy, firewall, VPN; Simple Network Management Protocol (SNMP), Network	39
policies.	
Final Test	40