

CS-7: Data Communications and Computer Networks

Introduction: 4 L

Network definition, Network topologies, Network classifications, Layered network architecture, protocol and interface, Overview of ISO-OSI reference model, Overview of TCP/IP protocol suite.

[1]: [1.1 to 1.4, 2.1 to 2.4]

Data Communication Fundamentals and Techniques: 8 L

Analog and digital signal, Data-rate limits, Digital to digital line encoding schemes, Pulse code modulation, Digital to analog modulation- ASK, FSK, PSK, QAM, multiplexing techniques- FDM, TDM, WDM, transmission media.

[1]: [3.1, 3.5, 4.1 (up to bipolar scheme), 4.2 (up to encoding), 5.1, 6.1 (up to multiplexing process), pg. 170, 7.1, 7.2]:

Networks Switching Techniques and Access mechanisms: 3 L

Circuit switching; Packet switching- Connectionless datagram switching, Connection-oriented virtual circuit switching.

[1]: [8.1 to 8.3]

[2]: [2.2.5]

Data Link Layer Functions and Protocol: 8 L

Error detection and error correction techniques, Data-link control- framing and flow control, Error recovery protocols- Stop and wait ARQ, Go-back-n ARQ, Selective repeat ARQ, Point to Point Protocol on Internet.

[1]: [3.1.2, 3.1.4, , 3.2 up to 3.2.2, 3.3, 3.4, 3.6.2]

Multiple Access Protocol and Networks: 7 L

ALOHA, CSMA/CD protocols, Ethernet LANS, connecting LAN and back-bone networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways.

[2]: [4.2.1, 4.2.2, 4.3 up to 4.3.4, 4.7.5]

UNDERGRADUATE PROGRAMME IN COMPUTER SCIENCE

Networks Layer Functions and Protocols: 8 L

Routing, Routing algorithms, Network layer protocol of Internet- IP protocol, Internet control protocols.

[2]: [5.1, 5.2 (up to 5.2.4), 5.6 (up to subnet), 5.6.3]

Transport Layer Functions and Protocols : 6 L

Transport services, Berkeley socket interface overview, Transport layer protocol of Internet-UDP and TCP.

[2]: [6.1 (up to 6.1.3), 6.4 (up to 6.4.2), 6.5 (up to 6.5.6)]

Overview of Application layer protocol: 4 L

Overview of DNS protocol, Overview of WWW & HTTP protocol.

[1]: [25.1 to 25.5, 27.1 to 27.3]

Recommended Reading Material

Text Books

1. B. A. Forouzan: *Data Communications and Networking*, 4th edition, Tata McGraw Hill Education Private Ltd., 2007.
2. A. S. Tanenbaum: *Computer Networks*, 4th edition, PEARSON, 2003.

Reference Books:

3. D. E. Comer, M.S.Narayanan, *Computer Networks and Internets with applications*, Fourth Edition, PEARSON, 2008.

LIST OF PRACTICALS CS-7: DATA COMMUNICATIONS AND COMPUTER NETWORKS

S. No.	Practical Title
1	SIMULATE CYCLIC REDUNDANCY CHECK (CRC) ERROR DETECTION ALGORITHM (CRC) for Noisy channel.
2	SIMULATE AND IMPLEMENT Stop and Wait Protocol for Noisy Channel.

UNDERGRADUATE PROGRAMME IN COMPUTER SCIENCE

3.	SIMULATE AND IMPLEMENT GO BACK N SLIDING WINDOW PROTOCOL.
4	SIMULATE AND IMPLEMENT SELECTIVE REPEAT SLIDING WINDOW PROTOCOL.
5.	SIMULATE AND IMPLEMENT DISTANCE VECTOR ROUTING ALGORITHM.
6.	SIMULATE AND IMPLEMENT DIJKESHTRRA ALGORITHM FOR SHORTEST PATH ROUTING.