

**Guidelines for B.Sc. (H) Computer Science IV Semester / B.Sc. Program VI Semester/ B.A.
Program VI Semester/ General Elective VI Semester (NEP UGCF 2022)**

**Computer Networks
DSC12/ DSC06/GE 6a
(Effective from Academic Year 2024-25)**

Revised on 13-02-2025

Unit	Topic	Chapter Section / Pages	Reference	Hours
I	Introduction: Types of computer networks, Internet, Intranet, network topologies (bus, star, ring, mesh, tree, hybrid topologies), network classifications. layered architecture approach, OSI Reference Model, TCP/IP Reference Model. Transmission Modes: simplex, half duplex and full duplex, network devices and their role.	Ch 1: 1.1 to 1.3 Ch 2: 2.1 to 2.3	[2]	8
2	Physical Layer: Analog signal, digital signal, the maximum data rate of a channel, transmission media (guided transmission media, wireless transmission, satellite communication), multiplexing (frequency division multiplexing, time-division multiplexing, wavelength division multiplexing). Guided Media (Wired) (Twisted pair, Coaxial Cable, Fiber Optics. Unguided Media (Radio Waves, Infrared, Micro-wave).	Ch 3: 3.1-3.5 Ch 6: 6.1 up to Interleaving, before example 6.8 Ch 7: 7.1, 7.2, 7.3	[2]	9
3	Data Link and MAC Layer: Data link layer services, error detection and correction techniques, error recovery protocols (stop and wait, go back n, selective repeat), multiple access protocols with collision detection, MAC addressing, Ethernet.	Ch 2: 2.6.5 Ch 3: 3.1, 3.2 - 3.2.1 till page 207 (till Hamming Code), 3.2.2 Ch 4: 4.2.2, 4.3.2 Ch 11: 11.2, 11.3, 11.4 (Up to 11.4.3)	[1] [2]	10
4	Network layer: Networks and Internetworks, virtual circuits and datagrams, addressing, subnetting, Dijkstra Routing algorithm, Distance vector routing, Overview of Network Layer protocols- (ARP, IPV4, ICMP, RARP, IPV6, DHCP)	Ch 5: 5.1, 5.2 (5.2.1, 5.2.2, 5.2.4), 5.6 (5.6.1-5.6.4)	[1]	10
5	Transport and Application Layer: Process to process Delivery- (client-server paradigm, connectionless versus connection-oriented service); User Datagram Protocols, TCP/IP protocol, Flow Control. Application layer Protocols	Ch 6: 6.1.1, 6.4 (Up to 6.4.1), 6.5.3, 6.5.4 Ch 7: 7.1, 7.2.4, 7.3- 7.3.1 till pg. 652 (before MIME Type), 7.3.4 (before Message Headers)	[1]	8

Essential/recommended readings:

1. Tanenbaum, A.S. & Wethrall, D.J. Computer Networks, 5th edition, Pearson Education, 2012.
2. Forouzan, B. A.. Data Communication and Networking, 5th edition, McGraw-Hill Education, 2017.

Suggested Practical List :

Introduce students to any network simulator tool and do the following:

1. To Study basic network command and Network configuration commands.
2. To study and perform PC to PC communication.
3. To create Star topology using Hub and Switch.
4. To create Bus, Ring, Tree, Hybrid, Mesh topologies.
5. Perform an initial Switch configuration.
6. Perform an initial Router configuration.
7. To implement Client Server Network.
8. To implement connection between devices using a router.
9. To perform remote desktop sharing within LAN connection.