CSCH 403 : Data Communication in Computer Network

UNIT I

Foundation: Building a Network, Requirements : Connectivity, Cost-Effective Resource Sharing, Support for Common Services, Network Architecture : Layering and Protocols, OSI Architecture, Internet Architecture, Implementing Network Software : Application Programming Interface (Sockets), Example Application, Protocol Implementation Issues, Performance : Bandwidth and Latency, Delay × Bandwidth Product, High-Speed Networks, Application Performance Needs. **(16 hours)**

UNIT II

Direct Link Networks : Hardware Building Blocks: Nodes, Links, Encoding (NRZ, NRZI, Manchester, 4B/5B), Framing : Byte-Oriented Protocols (BISYNC, PPP, DDCMP), Bit-Oriented Protocols (HDLC), Clock-Based Framing (SONET), Error Detection:Two-Dimensional Parity, Internet Checksum Algorithm, Cyclic Redundancy Check, Reliable Transmission : Stop-and-Wait, Sliding Window, Concurrent Logical Channels, , Ethernet (802.3): Physical Properties, Access Protocol, Experience with Ethernet, Token Rings (802.5, FDDI): Physical Properties, Token Ring Media Access Control, Token Ring Maintenance, Frame Format, Wireless (802.11):Physical Properties, Collision Avoidance, Distribution System, Frame Format, Network Adaptors. **(16 hours)**

UNIT III

Packet Switching : Switching and Forwarding : Datagrams, Virtual Circuit Switching, Source Routing, Bridges and LAN Switches: Learning Bridges, Spanning Tree Algorithm, Broadcast and Multicast, Limitations of Bridges, Cell Switching (ATM): Cells, Segmentation and Reassembly, Virtual Paths, Physical Layers for ATM, ATM in the LAN, Implementation and Performance. **(16 hours)**

TextBooks:

(1). "Computer Networks, A Systems Approach", Larry L. Peterson & Bruce S. Davie, Third Edition, Morgan Kaufmann Publishers, 2003

(2). "Computer Networks" , Andrew S. Tanenbaum David J. Wetherall, Fifth Edition, Pearson Education Limited 2014

(3). "A Professional's Guide to Data Communication in a TCP/IP World", E. Bryan Carne, Artech House Inc, 2004