

Concurrency Control (12%)
Serialization Locking Techniques Time stamp ordering Granularity of Data items.

Overview of Network Data Model, Hierarchical Data Model and their DML's. (4%)

Current trends in database (5%)

Main Reading

1. Korth, Silberchartz, " Database System Concepts" McGrawhill Publication.
2. Elmasri and Navathe, " Fundamentals of Database Systems", Addison Wesley, New Delhi.
3. Database Management Systems –R. Ramakrishnan, J.Gehrke – T.McGraw Hill

Supplementary Reading

1. Desai B., " An Introduction to Database Concepts", Galgotia Publications, New Delhi.
2. Rob,Coronel, "Database Systems (Design, Implementation and Management)"
3. Date C. J. , " An Introduction to Database Systems", Publication House, New Delhi.

CS302 Computer Communications Network

Prerequisites: CS 102, CS201, CS202.

Course Contents:

Introduction (5%)

Uses of computer networks. Types of computer networks and network topologies . Layered protocols and OSI reference model. Interfaces and services, Connection oriented and connectionless services. Service primitives, Relationship of services to protocols. TCP/IP reference models.

Physical Layer Fundamentals of communication theory: (15%)

Impairment to Transmission, Bandwidth limited signals, Channel speed and bit rate, Maximum data rate over noiseless and noisy channel, Baud rate and Bit rate, Shift keying - FSK, PSK, ASK. QAM. Pulse code modulation, Digital signal encoding, Multiplexing data channels :FDMA,TDMA and CDMA. Guided Transmission Media, Wireless Transmission. Synchronous, Asynchronous and Isochronous transmission. Packet, Message and Circuit switching. Telecommunication Network and Telecommunication Data Hierarchies. Examples: Modem, DSL.

Data Link Layer (15%)

Framing, Error control and Flow control, Error detection and correction. Hamming code and Cyclic Redundancy Check., Sliding Window protocols: Go back n and Selective Reject. HDLC: HDLC Options, Frame format and transmission process.

Medium Access Control Sublayer (15%)

IEEE LAN standards. ALOHA, CSMA/CD, CSMA/CA. IEEE 802.3 protocol: Switched Fast & Gigabit Ethernet. Wireless Network: IEEE 802.11, IEEE 802.16, Bluetooth. Repeaters, Switches and Bridges. Transparent (Spanning tree) and Source routing Bridges. LLC protocol – IEEE 802.2.

Network Layer (20%)

Virtual Circuit vs. Datagram Subnet. Store and Forward mechanism. Routing Algorithms: Optimality Principle, Shortest Path Routing, Unicast Routing: Distance Vector Routing, Link State Routing. Broadcast Routing: Flooding, Reverse path forwarding. Congestion Control. Providing Quality of Service (QOS).

Transport Layer**(10 %)**

Transport Layer Service Primitives. Connection Establishment and Connection release Management. Problem of old duplicates. Flow control and buffering.

TCP/IP protocol Suite**(15%)**

TCP/IP and Internetworking, Ports and sockets, IP address structure, Major features of IP, IP Datagram format, Major IP services and options, Subnets and Classless InterDomain routing. TCP: Major features of TCP, Passive and active open, TCP segment format, Flow and Congestion control. UDP. ARP and RARP.

Upper layer Protocols**(5%)**

Client Server paradigm, Domain name service.

Main Reading

1. Andrew S. Tanenbaum., “Computer Networks”, (5th Edition) Prentice Hall of India.

Supplementary Reading

1. Stalling W., “Data and Computer Communication” (8th edition) Prentice Hall of India.
2. Behrouz A Forouzan, “Data Communication and Networking”, (4rd edition), Tata McGraw Hill.
3. Behrouz A Forouzan, “TCP/IP Protocol Suite”, (3rd edition), Tata McGraw Hill.

CS303 Design and Analysis of Algorithms

Prerequisites: CS101, CS201, MT103, MT104

Course Contents:**Introduction****(20%)**

The Role of Algorithm in computing, Framework for design and analysis of algorithms, Growth of functions: asymptotic notation; Recurrences: substitution method, recursion-tree method, master method; Probabilistic analysis and randomized algorithms, indicator random variables.

Dynamic programming**(10%)**

Assembly line scheduling, matrix-chain multiplication, elements of DP, longest common subsequence;

Greedy algorithms:**(10%)**

Activity-selection problem, elements of greedy strategy, Huffman codes;

Amortized analysis:**(5%)**

Aggregate analysis, accounting method, potential method, dynamic tables

Graph Algorithms**(20%)**

Elementary graph algorithms; Minimum spanning tree: growing a spanning tree, Kruskal and Prim algorithm; Single-source shortest paths: Bellman-ford algorithm, Dijkstra’s algorithm. All pairs shortest paths: shortest paths and matrix multiplication, floyd-warshall algorithm.

String matching:**(5%)**

Naïve algorithm, Rabin-Karp algorithm

Computational geometry:**(10%)**

Line segment properties, intersection, finding convex hull, finding closest pair of points