**Data Communication (MCA-201)UNIT :- I**

Introduction to data communication: Components , data representation ,data flow and basic model ,data representation ,Serial & Parallel transmission ,Modes of data transmission, Encoding: Unipolar, Polar ,Bipolar line & block codes ,Data compression, Run length encoding, Relative encoding ,Image and multimedia compression. Review of analog & digital transmission methods**.**

**UNIT:-2**

Multiplexing: FDM, TDM, WDM, Synchronous & Statistical TDM, North American digital multiplexing hierarchy, European TDM, Spread spectrum: Frequency Hopping & Direct Sequence spread spectrum. Terminal handling & polling. Switched Communication Networks: Circuit, Message, Packet & Hybrid Switching, Softswitch Architecture with their comparative study, X.25, ISDN.

**UNIT:-3**

Physical Layer: Introduction, Interface, Standards, EIA-232-D, RJ-45, RJ-11, BNC connector & EIA-449, standards Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway. Study of various types of topology and their comparative study.

**UNIT:-4**

Transmission Errors : Content Error , flow integrity error , methods of error control ,Error detection ,Error correction ,Bit error rate , Error detection methods: Parity checking , Checksum Error Detection ,Cyclic Redudancy Check ,Hamming code , Interleaved codes , Block Parity , Convolution code, Hardware Implementation, Checksum.

**UNIT:-5**

Transmission Media: Transmission line characterestics, distortions, Crosstalk, Guided Media: Twisted Pair, Baseband & Broadband Coaxial.Optical Fibre : Physics and velocity of propagation of light , Advantages & Disadvantages ,Block diagram ,Nodes and classification ,Comparision,losses , light source and detectors , Construction.

References

1. Forouzan, “Data communication”, TATA McGraw
2. William Stallings ,”Data & Computer Communication”, Pearson Education
3. Miller,”Data Network and Comunication”,Cengage Delmar Learning
4. Godbole,”Data Communication & Network” , TMH

 **Data Base Management System (MCA-202)**

**UNIT-I**

Introduction: Advantage of DBMS approach, various view of data, data independence, schema and subschema, primary concepts of data models, Database languages, transaction management, Database administrator and users, data dictionary, overall system architecture.

**UNIT II**

ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables.

**UNIT-III**

Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types ofkeys, candidate, primary, alternate and foreign keys. Relational Algebra & SQL: The structure, relational algebra with extended operations, modifications of Database, idea of relational calculus, basic structure of SQL.

**UNIT--IV**

Functional Dependencies and Normalization: basic definitions, trivial and non trivial dependencies, closure set of dependencies and of attributes, irreducible set of dependencies, introduction to normalization, non loss decomposition, FD diagram, first, second, third Normal forms, dependency preservation, BCNF, multivalued dependencies and fourth normal form Join dependency and fifth normal form. **UNIT-V**

Database Integrity: general idea. Integrity rules, domain rules, attribute rules, relation rules, Databaserules, assertions, triggers, integrity and SQL.Transaction, concurrency and Recovery: basic concepts, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions, basic idea of serializability, basic idea of concurrency control, basic idea of deadlock, failure classification.

 Reference

1. A Silberschatz, H.F Korth, Sudersan “Database System Concepts” –, MGH Publication.

2. Elmasri & Navathe “Fundamentals of Database systems” – III ed.

3. B.C. Desai. “An introduction to Database systems” BPB

4. Raghurama Krishnan “Database Systems” TMH

 **E-Commerce and Governance(MCA-203)**

**Unit I**

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

**Unit II**

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

**Unit III**

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

**Unit IV**

E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nation wide networking in e governance, e-seva.

**Unit V**

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

**References:-**1. Gary P. Schneider, “E-commerce”, Cengage Learning India.

2.C.S.R. Prabhu, “E-governence: concept and case study”, PHI Learning Private Limited.

3.V. Rajaraman, “Essentials of E-Commerce Technology”, PHI Learning Private Limited.

4.David Whiteley, “E-commerce study , technology and applications”, TMH.

 **Data Structure (MCA-204)**

**UNIT-I**

Stack and Queue: contiguous implementations of stack, various operations on stack, various polish notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue; linked implementation of stack and queue- operations

**UNIT-II**

General List: list and it’s contiguous implementation, it’s drawback; singly linked list-operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays.

**UNIT-III**

Trees: definitions-height, depth, order, degree, parent and child relationship etc; Binary Trees- various theorems, complete binary tree, almost complete binary tree; Tree traversals-preorder, in order and post order traversals, their recursive and non recursive implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.

**UNIT-IV**

Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search, indexed sequential search, interpolation search; hashing-basics, methods, collision, resolution of collision, chaining; Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous list, shell sort, heap sort, tree sort.

**UNIT-V**

Graphs: related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist; traversal schemes- depth first search, breadth first search; Minimum spanning tree; shortest path algorithm; kruskals & dijkstras algorithm. Basic idea of B-tree- definition, order, degree, insertion & deletion operations; B+-Tree- definitions,

**References:**

1. Kruse R.L. Data Structures and Program Design in C; PHI

2. Aho “Data Structure & Algorithms”.

3. Trembly “Introduction to Data Structure with Applications”.

4. TennenBaum A.M. & others: Data Structures using C & C++; PHI

 **Operating System(MCA-205)**

**UNIT-I**

Introduction: Evolution of operating systems (History of evolution of OS with the generations of computers), Types of operating systems, Multitasking, Timesharing, Multithreading, Multi programming and, Real time operating systems, Different views of the operating system.

**UNIT-II**

Processes: The Process concept, The process control block, Systems programmer's view of processes, Operating system services for process management, Scheduling algorithms, First come first serve, Round Robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues, Performance evaluation of scheduling algorithms stated above.

**UNIT-III**

Memory Management : Memory management without swapping or paging, Concepts of swapping and paging, Page replacement algorithms namely, Least recently used, Optimal page replacement, Most recently used, Clock page replacement, First in First out (This includes discussion of Belady’s anomaly and the category of Stack algorithms), Modeling paging algorithms, Design issues for paging system, Segmentation, SegmentedPaging, Paged Segmentation.

**UNIT-IV**

**Deadlocks:** Concepts of deadlock detection, deadlock prevention, deadlock avoidance. Banker’s Algorithm Inter-process Communication and Synchronization: The need for inter-process synchronization, Concept of mutual exclusion, binary and counting semaphores, hardware support for mutual exclusion.

 **UNIT-V**

**Disks:** Disk hardware, Disk scheduling algorithms (namely First come first serve, shortest seek time first,SCAN, C-SCAN, LOOK and C-LOOK algorithms) Error handling, track-at-a-time caching, RAM Disks.Clocks: Clock hardware, memory-mapped terminals, I/O software.

**References:**

**1**.Galvin P.L.Abraham Silberschatz. "Operating System Concepts". John Wiley & Sons Company.

2. William Stallings “Operating Systems” , Prentice Hall of India Pvt. Ltd.3. Joshi R.C. “Operating System” Wiley India