Semester - II

CS-21: DATA BASE MANAGEMENT SYSTEMS

UNIT-I

Review of file systems, characteristics of database approach, DB system concepts and architecture, data models, schema & subschema, 3-tier architecture, Physical and logical data independence, data base languages: DDL & DML. Data modeling using E-R approach, Reduction of E-R diagrams to tables.

UNIT-II

Hierarchical data model: Basic concepts, tree-structure diagrams, physical and logical database record concepts, data manipulation, and overview of IMS Access & Storage structures.

Network data model : DBTG data structure diagrams concept of set, owner and member records, set membership, Insertion and retention options, data manipulation overview of DBTG DB system.

Relational model : Structures of relational database, Relational algebra, Key Concepts, Integrity Constraints, Concept Of normalization, types of data dependencies, INF, 2NF, 3NF, BCNF, 4NF and 5NF.

UNIT-III

Query processing: basic structure of query, translation of queries Into relational algebra, basic algorithms for executing query operations, use of SQL as a query processing language, simple and nested queries, concept of views, Join relations.

File organization in DBMS: Introduction,File Organization,Sequential File Organization,Indexed Sequential File Organization,Direct File Organization.

UNIT-IV

Concept of data base transaction, transaction states, ACID properties, serializability. Concurrency control in DB Systems: lock based and time-stamp based techniques, two phase commit protocol,Failure and recovery in DB systems, log-based recovery, shadow-paging.

UNIT-V

Distributed databases: concept and Architecture, comparative view of Distributed databases and centralized database, data fragmentation, level of Distributed transparency.

Object oriented databases: object-oriented models, object structure, inheritance, object identity and object containment.

Parallel databases: I/O parallelism, inter query and intra query parallelism, inter operation and intra operation parallelism

BOOKS;

1. Fundamentals of Database Systems - Elmsary and Navathe, Addison Wesley.
2. Principles of Database Systems - .Ullmari J. D., Galgotia Publications.
3. Introduction to Database Systems - Bipin C Desai Narosa Publishing House.
4. An Introduction to Database systems-Date C. J. Addison Wisley.

CS-22 Object Oriented Modelling and Design using UML

Unit-1: Overview of Object Oriented Systems Development: , Concept of Object Oriented Software, Importance of Object Oriented Software, Object Oriented Future, Object Oriented Systems Development Methodology, characteristics of object oriented modeling. Object Basics: An Object Oriented Philosophy, Objects, Object Behavior, Object Oriented Properties, links, Association, Aggregation, Generalization and Specialization.

Unit-2: Object Oriented Systems Development Life Cycle: The Process of Software Development, Developing Good Quality Software, Use Case Driven Approach for Object Oriented Systems Development, Reusability.
Object Oriented Methodologies: Introduction, Types of Object Oriented, Methodologies, Patterns, Unified Approach.

Unit-3: **Object Modeling-** Advance Modeling Concepts- Aggregation, Abstract Class. Multiple Inheritance, Generalization as an Extension,Generalization as a Restriction, Metadata,Constraints,Example of Object Model

Dynamic Modeling- Events, State and State Diagram,Elements of State Diagrams,Examples of State Diagrams, Advance Concepts in Dynamic Modeling,Concurrency,Example of Dynamic model

Functional Modeling- Functional Models, Data Flow Diagrams, Features of a DFD, Design flaws in DFD, Example of Functional model, Relationship between Object, Dynamic, and Functional Models

Unit-4: Unified Modeling Languages (UML): Introduction to Unified Modeling Language (UML), Static and Dynamic Models, UML Diagrams, UML Class Diagrams-Types, Structural Diagrams- Class, Object, Component, Deployment Diagrams, Behavioural Diagrams-Activity, Use Case, State Chart ,Collaboration, Sequence Diagrams, UML Extensibility.

Unit-5: Object Oriented Analysis – Identifying Use-Cases: Complexity in Object Oriented Analysis, Business Process Modeling and Business Object Analysis, Use-Case Driven Object Oriented Analysis, Use-Case Model, Developing Efficient Documentation.Object Analysis: Classification: Object Analysis, Classification Theory, Approaches for Identifying Classes, Class Responsibility Collaboration.
Identifying Relationships, Attributes, and Methods: Introduction, Associations, Inheritance Relationships, A Part of Relationship-Aggregation, Class Responsibility: Identifying Attributes and Methods, Class Responsibility: Defining Attributes, Object Responsibility: Methods and Messages.

TEXT BOOK

1. Grady Booch, "Object Oriented Analysis and Design with Applications", Addison Wesley, 1994.

REFERENCE BOOK :

1. Schach,* Stephen R., "An Introduction to Object Oriented Systems Analysis and Design with HJML and the Unified Process" Tata McGraw Hill, 2003.
2. Object-Oriented Analysis and Design with Applications (3rd Edition)-Grady Booch, Robert A. Maksimchuk, Michael W. Engel, and Bobbi J. Young

CS-23 : DESIGN & ANALYSIS OF ALGORITHM

UNIT I:

Algorithm Analysis – Time Space Tradeoff, Analysis Of Algorithm Efficiency, Asymptotic Notations – Conditional asymptotic notation , Removing condition from the conditional asymptotic notation , Recurrence equations – Solving recurrence equations

UNIT II:

Divide and Conquer Approach: Merge Sort, Quick sort , Strassen's algorithm for Matrix Multiplications. Graph Algorithms: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths.

UNIT III: Dynamic Programming: Dynamic Programming,Elements of Dynamic Programming, Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems. Greedy Algorithms: Elements of Greedy strategy, An activity selection problem, Huffman Codes, A task scheduling problem,knapsack problem,traveling salesman problem.

UNITIV

Backtracking: General Method, 8 Queens problem ,sum of subsets , graph coloring ,Hamiltonian problem ,Branch and Bound: introduction, knapsack problem, Assignment problem,travellingsalesmanproblem.

UNIT V

String matching: The naïve String Matching algorithm, The Rabin-Karp Algorithm, The Knuth-Morris Pratt algorithm. NP-Complete Problem: Polynomial-time verification, NP-Completeness- class P ,class NP and NP completeness problem, NP Hard completeness problem.

TEXT BOOK :

Introduction to the Resign and Analysis of Algorithms, Anany Levitin : Pearson Education, 2003.

REFERENCE BOOKS :

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms",Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.
3. Fundamentals of Computer Algorithms, Horowitz and Sahni, Galgotia Publications.

4. Introduction to. Algorithms, Gormen, Leiserson and Rivest : Prentice Hal of India.

CS-24 ; DATA COMMUNICATION AND NETWORKS

UNIT-I:

Introduction to computer Networks:

- What is computer network, Tools and motivation.
- Application of networks.
- point-to-point or switched networks.

  Circuit switched networks \ packet switched networks.

  Broad Cast Networks, Packet radio networks, Satellite Networks, LAN.

- Network protocols, OSI model.
- Examples of some networks, concept of delays, how to reduce delays.

Data Transmission:

- Transmission Terminology
- Analog & Digital data Transmission
- Transmission impairments.
- Transmission media and its characteristics.

UNIT-II

Data encoding and communication technique PCM, AM, FM and PM.

Asynchronous Transmission, synchronous Transmission, Error detection technique, Parity, CRC & FEC.

Interfacing RS. 232 and X.21 Multiplexing and communication Hardware.

FDM, TDM, STDM, Modems, Multiplexer, Demultiplexer, concentrators, Front end processors.

UNIT-III

MAC and Data Link Layer :

- DLL fundamentals.
- Retransmission strategies.
- Contention based MAC protocols
- Polling based MAC Protocols
- MAC Protocols High speed networks.

UNIT-IV

Network Layer :

- Introduction to layer.functionality
- Routing
- Congestics Control Algorithms
- IP
- Internetworking.

UNIT-V

Transport Layer and application layer services:

- Transport services and mechanism
- Transport control mechanism
- TCP/UDP
- RPC : (Remote Procedure Call)
- Applications: FTP, Telnet, E-mail, WWW, DNS.

BOOKS:

1. Computer Network A system approach, 4th ed.: Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann Publishers.
2. . Data Communications and networks:Forouzan, TMH.

Reference Books:

1. Computer Networks:Andrew Tanenbaum, PHI Publication,
2. Data & Computer Communication: William Stallings, PHI Publication.

CS-25: CORE JAVA

UNIT-I: Paradigm of programming languages, comparison of procedure oriented approaches and object oriented concepts, basic concept of OOPS, introduction to Java, basic features of Java, JVM concepts data types, variables, Java operators, expressions, various types of control statements, Arrays.

Class & Objects : Class fundamentals, creating object's, introducing methods, static methods, constructors, types of constructors, constructor overloading, this keyword, garbage collection, finalize method,

UNIT-II

Inheritance and polymorphism : inheritance basics, access control, multilevel inheritance, -abstract class, polymorphism, final keyword.**Packages and interfaces** : Definition of package, seeing the CLASS PATH, package naming, interface.

UNIT-III

Multithreading, I/O and string handling, introduction to multithreading, main thread, lava thread model, thread class & runnable interface, thread properties,synchronization in java, interthread communication, I/O basics, FILE stream classes, byte stream classes *and* character stream classes, Input and output stream hierarchy reading and writing data from and to file, transient and volatile modifiers, stream tokenizer, serialization, print stream, random access files.

UNIT-IV

Applet programming, graphics & user interfaces and exception handling, applet class, applet architecture, handling events, HTML applet tag, passing parameter to applet, exceptions, types of exception, handling of exceptions using try, catch, catching multiple exceptions using finally clause, throwing exception.

UNIT-V Awt: Awt class, Awt controls, layouts and layout manager, event handling by awt components, menu bars and menus.

RECOMMENDED AND REFERENCE BOOKS :

1. Programming with Java, E. Balaguruswamy.
2. Java Complete Reference, Herbert Schildt.
3. Web Enabled Commercial Application Development using Java 2.0, Ivan Bayross.

REFERENCE BOOKS :

1. Core Java Vol-I Fundamentals, Core Java Vol-II Fundamentals, Gay Cornell.
2. Java In a Nutshell, David Flanagan (O'reilly Publication)