

### **3rd Semester (Code-301 Data Communication And Networks)**

#### **Unit-1**

**Introduction:** History & development of computer network, net topologies, Transmission media-UTP, STP, coaxial Cable, Optical Fiber, analog & digital transmission, multiplexing FDM, TDM, Classification of Network in various ways.

#### **Unit-2**

**Data Transmission Basics:** Synchronous/Asynchronous, Error detection and correction methods, circuit, message, packet and cell switching, connection oriented and connectionless network.  
**ISO-OSI model, TCP/IP model, Ethernet, CSMA/CD, CSMA/CA, Token passing ring, Medium Access sub Layer:**  
Medium Access sub layer-Channel Allocation, LAN protocols-ALOHA protocols-Overview of IEEE standards.

#### **Unit-3**

**Networking Devices:** Hubs, Repeaters, internetworking: Routers, Bridges, Switches, Gateways, Routing Basics, Routing algorithms, Implementation of wired and wireless networks, IP addressing, Sub netting, CIDR, Designing a campus wide-network.

#### **Unit-4**

**Transport Layer:** Transport Layer-Design issues, connection management, session Layer Design issues, remote procedure call.  
**Presentation Layer:** Design issues, Data compression techniques, cryptography-TCP Window Management.

#### **Unit-5**

**Application Layer:** File Transfer, Access and Management Electronic mail, Virtual Terminals, Other application, Example Network-Network and Public Networks.

### **3rd Semester (Code-302 DataBase Management System)**

#### **Unit-1**

**Database Systems:** View of Data Models, Database Languages, DBMS Architecture, Database Users and Data Independence. ER Modeling, relation types, role and Structural Constraints, Extended ER Modeling Features, Design of an ER Database Schema, Reduction of ER Schema of Tables, Relational Model:Relational Model Concepts, Relational Algebra.

#### **Unit-2**

Introduction to SQL & PL/SQL: SQL data types and literals, Types of SQL commands, SQL operators, Tables, views and indexes, Queries and sub queries, Aggregate functions, Cursors in operators, SOL PL/SQL: data types, character set, variables, literals, constants, commit, rollback, locking, exceptions, triggers.

#### **Unit-3**

**Relational Database Design:** Functional and multi-valued Dependencies, Desirable properties of Decomposition, Normalization up to BCNF. Concept and Design of Object Oriented Database, Data Normalization: Functional Dependencies, Normal form up to 3rd normal form.

#### **Unit-4**

**Transaction system:** Testing of serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures log based recovery, checkpoints, Distributed data storage, concurrent control.

#### **Unit-5**

**Concurrency control:** Locking Techniques for concurrency control, time stamping protocols for concurrency control, multiple granularity, Multi version schemes, Transaction processing security and authorization, Database Security, Recovery with concurrent transaction.

## 3rd Semester (Code-303 OOP With C++)

### Unit-1

Introduction: Introduction to programming Techniques- POP, OOP, OOP Concept, Characteristics, Applications, Introduction to OOP languages, Introduction to C++, Features Bridging C & C++ (Overview of C Concepts), C++ Data Types, Tokens, Keywords, Operators, Decision Making & Branching: If Statement, If-Else statement, Nesting of If Else, Switch statement, Looping: While Statement, Do Statement, For Statement, Overview of functions & structure in C.

### Unit-2

Class & Objects: Declaring Data Members, Members Functions, and Types of class Members, Array within a class. Class Function Definition: Member Function Definition inside the class and outside the class, Friend function, Inline function, Static Members & functions, Scope Resolution Operator, Private and Public Member Functions, Nesting of Member Functions. Creating Objects, Accessing class data members, Accessing member functions, Arrays of Objects, Objects as function arguments: Pass by value, Pass by reference, Pointers to Objects.

### Unit-3

Constructors and Destructors: Declaration and Definition, Default Constructors, Parameterized Constructors, Constructor Overloading, Copy Constructors. Destructors: Definition and use. Inheritance- Extending Classes concept of inheritance, Base class, Derived class, Defining derived Classes, Visibility Modes: Private, Public, Protected: Types of Inheritance- Single, Multiple, Multilevel, Hybrid, Hierarchical, Nesting of classes.

### Unit-4

Function Overloading & Operator Overloading: Binary & Unary Operators, Polymorphism: Definition, early Binding, Polymorphism with pointers, Virtual Functions, Late binding, pure virtual functions, Input / output files: Streams, buffers & IO streams, header files, redirection, file input and output.

### Unit-5

Files and exception handling: Streams and files, Namespaces, Exception handing, generic Classes, Disk file I/O with streams, file pointers, error handing in files I/O with member function memory as a stream object, command line arguments.

### **3rd Semester (Code-304 Design And Analysis Of Algorithms)**

#### **Unit-1**

**Introduction:** Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions, Performance measurements, Sorting and order Statistics- Shell sort, Quick sort, Merge sort, Heap sort, comparison of sorting algorithms, Sorting in linear time.

#### **Unit-2**

**Advanced Data Structures:** Red- Black trees, B-trees, Binomial Heaps, Fibonacci Heaps.

#### **Unit-3**

Divide and conquer with examples such as Sorting, Matrix Multiplication, convex hull and Searching. Greedy methods with examples such as Optimal Reliability Allocation, Knapsack, Minimum Spanning trees- Prim's and Kruskal's algorithms, Single source shortest paths, Dijkstra's and Bellman Ford algorithms.

#### **Unit-4**

Dynamic programming with examples such as Knapsack. All pair shortest paths- Warshall's and floyd's algorithms, Resource allocation problem. Backtracking, Branch and Bound with examples such as Travelling Salesman Problem, Graph Coloring, Hamiltonian Cycles.

#### **Unit-5**

**Selected Topics:** Algebraic Computation, Fast Fourier Transform, String Matching, Theory of NP- Completeness, Approximation algorithms and Randomized algorithms.

### 3rd Semester (Code-305 Operating System)

#### Unit- 1

**Introduction:** Operating system and functions, Classification of Operating systems interactive, Time sharing, Real time System, Multiprocess systems, Multithreaded System, Operating Systems Structure-Layered structure, System Components, Operating System service. Reentrant Kernels, Monolithic and Microkernel Systems.

#### Unit-2

**Concurrent Processes:** Process concept, Principle of concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores Test and Set operation, Classical Problem in concurrency- Dining Philosopher Problem, Sleeping Barber Problem, Inter Process Communication models and Schemes, Process Generation.

#### Unit-3

**CPU Scheduling:** Scheduling Concepts, Performance Criteria, Process States, Process Transition diagram Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling.  
**Deadlock:** System model Deadlock Characterization, Prevention, Avoidance and detection, Recovery from deadlock.

#### Unit-4

**Memory Management:** Basic bare machine. Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging Page replacement algorithms, thrashing, Cache memory organization, Locality of reference.

#### Unit-5

**I/O Management and Disk Scheduling:** I/O devices, and I/O subsystems, I/O buffering Disk storage and disk scheduling, RAID. **File System:** File concept, file organization and access mechanism, file directors, and File sharing, File system implementation issues, File system protection and security.