

## BTCSE 401 (COMMUNICATION SYSTEM)

### Unit - I

**ANALOG MODULATION:** Amplitude Modulation, Generation & Demodulation of AM DSBSC waves, Coherent Detection of DSBSC Signal, Quadrature-Carrier Multiplexing, Generation of SSB waves, Demodulation of SSB waves.

**PULSE ANALOG MODULATION:** Sampling theorem, Sampling of Low Pass and band pass signals, Aliasing, Aperture effect, PAM, PWM and PPM generation and modulation, TDM, Cross talk, Spectral analysis of PAM, PWM and PPM Waves, S/N ratio for different pulse modulation.

### Unit – II

**ANGLE MODULATION:** Frequency & phase Modulation, narrow & wide-band, FM, BW of FM waves, Generation & demodulation of FM waves, S/N ratio, Comparison of AM, FM & PM.

### Unit – III

**RANDOM PROCESS:** Probability Random variable, Probability density, mean, moments, transformation of random variables, Stationary Process, mean, autocorrelation and covariance functions, ergodicity, power spectral density, response of linear systems to random signals, Gaussian distribution, central limit theorem.

### Unit – IV

**PULSE DIGITAL MODULATION:** Pulse Code Modulation signal to quantization noise ratio, Probability of error for PCM in AWGN Channel, DPCM, DM and ADM modulators and demodulators, Prediction Filter, line coding, Inter symbol Interference.

Digital transmission through carrier modulation Amplitude, Frequency and phase shift keying, Differential phase shift keying, CPFSK, MSK OPSK and QAM modulation & detection, probability of error calculation, Matched Filter.

### Unit - V

**INTRODUCTION TO INFORMATION THEORY:** Measurement of Information, mutual information Shannon's Theorem Source coding, channel coding and channel capacity theorem. Huffman code, Lempel – ziv code.

### TEXTBOOKS

- Taub & Schilling, *Principles of Communication Systems*, TMH, 1998.

### REFERENCE BOOKS

- J. C. Hancock, *An Introduction to the Principles of Communication Theory*, TMH, 1998.
- Simon Haykins, *Communication Systems*, John Wiley, 1998.

## **BTCSE 402 (DATABASE MANAGEMENT SYSTEM)**

### **Unit-I**

**INTRODUCTION:** Data base system concepts and its architecture, Data models schema and instances, Data independence and data base language and interface, Data definition languages, DML. Overall data base structure.

**DATA MODELING USING ER MODEL:** ER model concept, notation for ER diagrams mapping constraints, Keys, Concept of super key, candidate key, primary key generalizations, Aggregation, reducing ER diagrams to tables, extended ER model.

### **Unit-II**

**RELATIONAL DATA MODEL AND LANGUAGE:** Relational data model concepts, integrity constraints, Keys domain constraints, referential integrity, assertions, triggers, foreign key relational algebra, relational calculus, domain and tuple calculus, SQL data definition queries and updates in SQL.

### **Unit-III**

**DATABASE DESIGN:** Functional dependencies, normal forms, 1NF, 2NF, 3NF and BCNF, multi-valued dependencies fourth normal forms, join dependencies and fifth normal forms. Inclusion dependencies, loss less join decompositions, normalization using FD, MVD and JDs, alternatives approaches to database design.

### **Unit-IV**

**STORAGE AND FILE ORGANIZATION:** File Organization, Indexing and Hashing Overview of file organization techniques, Indexing and Hashing- Basic concepts, Static Hashing, Dynamic Hashing, Ordered indices, Multi-level indexes, B-Tree index files, B+-Tree index files, Buffer management.

### **Unit-V**

**TRANSACTION PROCESSING CONCEPTS:** Transaction processing system, schedule and recoverability, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recovery from transaction failures, deadlock handling.

**CONCURRENCY CONTROL TECHNIQUES:** Locking Techniques for concurrency control, time stamping protocols for concurrency control.

### **TEXTBOOKS**

- R. Elmasri & S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education, 6th edition, 2010.

### **REFERENCE BOOKS**

- Silberschatz, H. Korth & S. Sudarshan, *Database System Concepts*, TMH, 5th Edition, 2010.
- R. Ramakrishnan & J. Gehrke, *Database Management Systems*, 3rd edition, TMH, 2007.

## BTCSE 403 (DESIGN AND ANALYSIS OF ALGORITHMS)

### Unit-I

**INTRODUCTION:** Concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations. Growth of Functions, Master's Theorem.

### Unit-II

**SEARCHING AND SORTING:** Structure of divide-and-conquer algorithms; examples: binary search, quick sort, Strassen Multiplication; merge sort, heap sort and Analysis of divide and conquer run time recurrence relations.

### Unit-III

**GREEDY ALGORITHMS:** Overview of the greedy paradigm examples of exact optimization solution, Activity Scheduling, minimum cost spanning tree, approximate solutions: Knapsack problem, Kruskal's algorithm and Prim's algorithm for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths.

### Unit-IV

**DYNAMIC PROGRAMMING:** Principle of dynamic programming. Applications: Floyd-Warshall algorithm for all pair shortest paths. Matrix multiplication, Traveling salesman Problem, longest Common sequence

**BACK TRACKING:** Overview, 8-queen problem, and Knapsack problem. Traveling Salesman problem.

**STRING MATCHING:** The naïve String Matching algorithm, The Rabin-Karp Algorithm, The Knuth-Morris Pratt algorithm.

### Unit-V

**COMPUTATIONAL COMPLEXITY:** Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples: Circuit Satisfiability, Vertex cover, Subset Sum problem, Randomized Algorithms, NP-Hard and NP-Completeness, Approximation Algorithms.

### TEXTBOOKS

- E. Horowitz, S. Sahni, & S. Rajsekarani, *Fundamentals of Computer Algorithms*, Galgotia Publication.
- T. H. Cormen, C. E. Leiserson, R. L. Rivest & C. Stein, *Introduction to Algorithms*, 3rd Edition, PHI, 2010.
- Sara Baase, *Computer Algorithms: Introduction to design and analysis*, 3rd Edition, Pearson, 2002.

### REFERENCE BOOKS

- J. Kleinberg & E. Tardos, *Algorithm Design*, 1st Edition, Pearson, 2012.
- S. Dasgupta, C. Papadimitriou & U. Vazirani, *Algorithms*, 1st Edition, TMH, 2013.

## **BTCSE 404 (SOFTWARE ENGINEERING)**

### **Unit I**

**Introduction, Software Model and Process:** Software Crisis, Need and Definition of Software Engineering, Software Myths, Process Model: Waterfall Model, V-Model, Incremental Model, Evolutionary Model,

### **Unit II**

**Requirement Engineering:** Inception, Elicitation, Elaboration, Negotiation, Specification, Validation, Requirements, Analysis & Model: Domain Analysis, Data Flow Modeling, Class-based Modeling, CRC Modeling.

### **Unit III**

**Software Design Concepts:** Abstraction, Modularity, Cohesion, Coupling, Software Design: Architectural Design, Data Design: Entity Relationship Design, User Interface Design, Object Oriented Design, Web Application Design: Aesthetic Design, Content Design, Navigation Design

### **Unit IV**

**Testing and Quality:** Software Testing, Verification and Validation, Test Strategy: Unit Testing, Integration Testing, System Testing, User Acceptance Testing: Alpha & Beta Testing, Internal and External View of Testing: White Box Testing, Black Box Testing, Quality Concepts, Garvin's Quality Dimension, McCall's Quality Factors, ISO 9126 Quality Factors

### **Unit V**

**Maintenance and Software Metrics:** Maintenance: Corrective, Perfective, Adaptive, Metrics: Size Oriented Metrics, Function Point Metrics, CK Metrics suite, Introduction to Risk Management

### **TEXT BOOKS**

- R. S. Pressman, "Software Engineering – A practitioner's approach", 7<sup>th</sup> Edition, McGraw Hill Int. Ed., 1992.
- K. K. Agarwal and Yogesh Singh, Software Engineering, New Age

### **REFERENCE BOOKS**

- P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
- Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
- James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons

## BTCSE 405 (OPERATING SYSTEM)

### Unit-I

**INTRODUCTION:** Operating Systems functions, Types of operating systems, Multiprogramming systems, Batch systems, Time-sharing systems, Operating system operations, Special purpose operating systems, Distributed systems, Different computing environments.

**OPERATING SYSTEM ORGANIZATION:** Processor and user modes, user operating system interface, Kernels, System calls and its types, System programs, Operating system structures, Virtual machines.

### Unit-II

**CONCURRENT PROCESSES:** Process concept, Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Classical problems in Concurrency, Inter Process Communication, Process Generation, Process Scheduling.

**CPU SCHEDULING:** Scheduling Concept, Performance Criteria Scheduling Algorithm, Evolution, Multiprocessor Scheduling.

### Unit-III

**DEADLOCK:** System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from deadlock combined approach.

### Unit-IV

**MEMORY MANAGEMENT:** Base machine, Resident monitor, Multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Organization, Impact on performance.

### Unit-V

**I/O MANAGEMENT & DISK SCHEDULING:** I/O devices and organization of I/O function, I/O Buffering, DISK I/O, Operating System Design Issues.

**FILE SYSTEM:** File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues

### TEXTBOOK

- A Silberschatz, P.B. Galvin & G. Gagne, *Operating Systems Concepts*, 8th edition, John Wiley Publications, 2008.

### REFERENCE BOOKS

- G. Nutt, *Operating Systems: A Modern Perspective*, Pearson Education, 2nd edition, 1997.
- A.S. Tanenbaum, *Modern Operating Systems*, 3rd edition, Pearson Education, 2007.
- W. Stallings, *Operating Systems, Internals & Design Principles*, 5th edition, PHI, 2008.