

BS301 : Computer Based Numerical Techniques

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation. Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, Ill conditioned system of equations, Refinement of solution. Gauss Seidal iterative method, Rate of Convergence. Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Stirling's Bessel's Everett's formula. Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula, Hermite's interpolation Approximation of function by Taylor's series and Chebyshev polynomial.

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Boole's Rule Euler-Maclaurin Formula Solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector method, Automatic error monitoring, stability of solution.

References:

1. Rajaraman V., :Computer Oriented Numerical Methods". PHI
2. Gerald and Wheatley, "Applied Numerical Analyses", AW
3. Jain, Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations:", New Age Int.
4. Grewal B.S., "Numerical methods in Engineering and Science. Khanna Publishers, Delhi.
5. T.Veerarajan, T Ramchandran, "Theory and Problems of Numerical Methods", TMH

BS302 : DBMS

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database structure. Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict and view serializable schedule, recoverability, Recovery from transaction failures, deadlock handling .

References:

1. Date C.J. "An Introduction to Database System". Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems" Addison Wesley
4. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.

BS303 : Digital Electronics

Representation of information & Basic Building Blocks: Introduction to Computer, Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD), ASCII, EBCDIC and their conversion. Logic gates, Boolean Algebra, K-map simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry look ahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (Synchronous and asynchronous), ALU, Micro-operation. ALU-chip, Faster Algorithm and Implementation (multiplication & Division).

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle), Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers.

Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

I/O Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

References:

1. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia
2. Mano Morris, "Computer System Architecture" PHI
3. Zaky & Hamacher, "Computer Organization: McGraw Hill
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.

BS304 : Web technology

History of the web, Growth of the Web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber laws, Web project, Web Team, Team dynamics.

Communication Issues, the client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML. Java Script: Introduction, Documents, Documents, forms, statements, functions, objects in Java Script, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

XML: Introduction, Display and XML Documents, Data Interchange with an XML document, Document types definitions, Parsers using XML, Client-side usage, Server Side usage.

Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

References:

1. Burdman, "Collaborative Web Development", Addison Wesley
2. Sharma & Sharma, "Developing E-Commerce Sites" Addison Wesley
3. Iva Bayross, "Web Technologies Part-II" BPB Publications
4. Shishir Gundavarma, "CGI Programming on the World Wide Web" O'Reilly & Associate
5. DON Box, "Essential COM" Addison Wesley
6. Greg Buczek, "ASP Developer's Guide" TMH