

49

**Unit I**

Solution of transcendental and polynomial equations in one variable and solutions of system of linear equations. Errors in numerical calculations, Bisection method, Iteration method, Newton Rapson method, False Position method, Jacobi Iterative method, Gauss Seidel method, Gauss Elimination method.

**Unit II**

Newton's interpolation formulas, Lagrange's interpolation formula, Newtons divided Difference interpolation formula, Hermite's problem and Hermite's interpolation, Spline interpolations.

**Unit III**

Numerical Differentiation and Integration: Numerical differentiation, numerical integration, Trapezoidal rule, Simpson's 1/3 rule, Newton Cotes formulas, Gauss Legendre, Chebyshev formula.

**Unit IV**

Numerical Solution of Ordinary Differential Equations: O.D.E. of first order, Euler, Picards and Tailors series method, Runge-Kutta Method, Predictor-Corrector method.

**Unit V**

Discrete Probability: various definitions additive and multiplicative theorem & problems, Bayes' Theorem, Basic concept of Probability distribution, Binomial distribution, Poisson Distribution, normal distribution, correlation and regression analysis, Monte Carlo techniques.

**Text Books:**

1. Numerical algorithms computations in science and engineering by E. V. Krishnarnurthy and S.K. Sen.
2. Numerical methods by E.S.Sastry.
3. Basic statistical computing by D.Cook, A.H. Vraven.
4. Numerical Methods for Scientistics and Engineers by M.K.Jain.

MCS 202

SOFTWARE ENGINEERING

(SS-369) =  
M  
M-1A  
M-17

**Unit I**

Introduction to Software Engineering: Software development life cycle, project size and its categories. Software team Structure-democratic, chief programmer and hierarchical team structures, project control. Life cycle models-Spiral model, Waterfall model, Prototyping model. Software cost estimation techniques-Expert judgment, Delphi cost estimation techniques, WBS cost estimation techniques, COCOMO model.

**Unit II**

Software Design: fundamental design concepts, abstraction, information hiding, structure, modularity, modules and modularization criteria, coupling and cohesion. Design-notations- data flow diagrams, structure charts, HIPO diagrams, procedure templates, pseudo codes, structured flowcharts, structured english, decision tables. Design techniques-stepwise refinement, structured design, integrated top-down development. Object oriented design concept and methods, class and object definition, refinery operation.

**Unit III**

Software Quality Assurance: quality concepts, metrics for software quality, software quality assurance, SQA activities, software reviews, formal technical reviews, software reliability.

**Unit IV**

Software testing techniques: Software testing fundamentals, white box testing, basis path testing, control structure testing, black box testing. Software testing strategies: strategic approach to software testing, unit testing, integration testing, validation testing, system testing.

**Unit V**

Computer Aided Software Engineering: building blocks for CASE, taxonomy of CASE tools, Integrated CASE environments.

Brief introduction to Ada and features relevant to software engineering.

**Text Books:**

1. An Integrated approach to Software Engineering by Pankaj Jalote.
2. Software Engineering Concepts by Richard Fairley.
3. Software Engineering by R.S. Pressman.

**MCS 203     DATABASE MANAGEMENT SYSTEM (ORACLE- BASED)**

M-11

M-12

M-17

**Unit I**

Introduction to E-R Model & Relational Algebra: Introduction, advantage of DBMS approach, various views of data, data independence, schema & sub-schema, primary concept of data models, Data base languages, Database Administrator & users, Data dictionary, Overall System architecture. E-R Model: basic concept, design issues, mapping constraints, keys, ER-diagram, weak and strong entity sets, specialization & generalization, aggregation, design of ER Schema to tables.

**Unit II**

Relational Model: domains, relations, relational databases, various types of keys (super, candidate, primary, alternate, secondary, foreign keys), structure of Relational Algebra, Relational Algebra with extended operations, modifications of databases, idea of relational calculus.

**Unit III**

SQL, Functional Dependencies & Normalization: basic structure of SQL, set operations, aggregate functions, null values, nested sub-queries, views, modification of databases, join relations, DDL, DML, Assertion and Triggers: basic definitions, trivial and non trivial dependencies, closure set of dependencies & of attributes, canonical cover. Introductions to normalization: loss less and lossy decomposition, First, second and third normal forms, dependency preservation, BCNF, multi-valued dependencies and fourth normal form, join dependencies and fifth normal form.

**Unit IV**

Transactions, Concurrency & Distributed Databases: basic concept of transaction, ACID properties, transaction state, concurrent executions, basic idea of serializability, basic idea of concurrency control, basic idea of deadlock, failure classification, data access. Recovery & Atomicity -log based recovery, deferred database modification, immediate database modification, check points. Distributed Databases: basic idea, distributed data storage, data replication, data fragmentation (horizontal, vertical & mixed).

**Unit V**

Storage Structure, File Organization, Network & Hierarchical Model: overview of physical storage media, magnetic disks (performance and optimization), basic idea of RAID, File organization, organization of records in files, basic concept of indexing, ordered indices. Network model, Hierarchical Models: Basic Idea, Data structure diagram, DBTG model, Implementation of Network model, Tree structure diagram, Implementation technique of Hierarchical model, comparison of three models.

**Text Book:**

1. Database System Concepts by A.Silberschatz, H.Korth (3<sup>rd</sup> edition) McGraw Hill Pub.

**Reference Books :**

1. An Introduction to Database System by C.J. Date (6th edition) Addison Wesley.
2. An Introduction to Database System by B.C. Desai, Galgotia Publication.
3. Fundamentals of Database System by Elmasri & Navathe(3rd edition)Addison Wesley.
4. Database Management System by Alexix Leon Mathews Leon
5. Oracle 8 The complete reference by Koch & Loney, Oracle Press .

Computer Networks

## Unit-I

Basic Concept of Computer Network : Line Configuration, Topology, Transmission Modes, Categories of Network, Signals (Analog & Digital), Encoding and Modulation : ( Digital to Digital Conversion, Analog to Digital Conversion, Digital to Analog Conversion, Analog to Analog Conversion), Multiplexing, Layered network architecture, ISO-OSI Reference Model.

## Unit-II

Transmission media, Error detection, parity check codes, CRC, Hamming code, Data Link Protocols Stop and wait protocol, Noise free and noisy channels, Sliding window protocol (Go Back n ARQ, Selective Reject ARQ), HDLC data link protocol, Asynchronous transfer mode (ATM) : ATM cells, header and cell formats, layers in ATM, class 1,2,3,4, traffic.

## Unit-III

Random Access Data Networks: Concept of Random access, pure ALOHA, slotted ALOHA. Local Area Networks: -IEEE 802.3, 802.4 and 802.5 protocols, FDDI protocol.

## Unit-IV

Network Layer Protocols: Design Issues, virtual circuits and datagram, routing Algorithms, Flow and Congestion control: General principles, window flow control, packet discarding, traffic shaping, choke pocket, dead locks and their avoidance.

## Unit-V

Presentation and Application Layer protocols: presentation concepts, SNMP, Abstract syntax Notation 1 (ASN 1), Cryptography: substitution and transposition ciphers, DES, DES Chaining, Breaking DES, Public Key Cryptography, authentication protocols, electronic mail.

TextBooks:-

1. A.S. Tanenbaum "Computer Networks" PHI
2. Data Communication and Networking : Behrouz A. Frozen

Reference Books:-

1. J.F. Hayes "Modelling and Analysis Computer Communication Networks"
2. D. Bestsekas and R. Gallego "Data Networks", PHI 2nd edition.
3. D.E. Comer "Internetworking with TCP/IP" PHI.
4. G.E. Keiser "Local Area Networks" McGraw Hills.
5. W. Stallings "Data & computer communication" Maxwell international