

Master of Computer Application

1st Year

SEMESTER - I

| | |
|----------|---|
| MCA-101: | Programming Fundamental & Problem Solving Using C |
| MCA-102: | Concept of Information Technology |
| MCA-103 | Mathematical Foundation –I (Discrete) |
| MCA-104 | Digital Electronics & Microprocessor |
| MCA-105 | Organizational Structures & Personal Management |

SEMESTER- II

| | |
|---------|--|
| MCA-201 | Data & File Structures Using C |
| MCA-202 | Computer Organisation |
| MCA-203 | Technical Documentation & Communication Skills |
| MCA-204 | Mathematical Foundation -II (Graph - Theory) |
| MCA-205 | Object Oriented Programming Using C++ |

2nd Year

SEMESTER-III

| | |
|---------|-----------------------------------|
| MCA-301 | Database Management Systems |
| MCA-302 | Operating System |
| MCA-303 | Managerial Economics |
| MCA-304 | Design and Analysis of Algorithms |
| MCA-305 | Software Engineering |

SEMESTER-IV

| | |
|----------|---|
| MCA-401 | Data Communication & Network |
| MCA- 402 | Business Organization and Accounting Principles |
| MCA- 403 | Mathematical Foundation –III(Computer Oriented Numerical Methods) |
| MCA- 404 | Internet and JAVA Programming |
| MCA-405 | Advanced Unix and Shell programming |

3rd Year

SEMESTER- V

| | |
|---------|---------------------------------|
| MCA-501 | Computer Graphics |
| MCA-502 | Distributed Systems |
| MCA-503 | Introduction To Compiler Design |
| MCA-504 | Artificial Intelligence |
| MCA-505 | Elective |

SEMESTER-VI

Project Training & Viva

Electives

1. Client-Server Technology
2. Advance DBMS
3. Advance Networking
4. Multimedia
5. Simulation/Modelling
6. CAD/CAM
7. Computer Architecture
8. Data Mining
9. Mobile Computing

SEMESTER-I

MCA101: Programming fundamentals and Problem Solving using C

Concepts of Programming, Problems solving on computer, Algorithms and flow charts

Data Types, Operators and Expressions; Control statements; if – else, while, for, do-while, switch; functions and modular programming; Scope of variables, parameter passing, recursion, block structure; preprocessor statements; arrays; input and output – printf and scanf .

REFERENCES:

1. Programming with C : Byron S. Gottfried (schaum Series) , TMH Publications
2. Programming with C : K.R.Venugopal and Sudeep R. Prasad, TMH Publications
3. The Spirit of C : Cooper Mullah, Jaico Publishing House 1987

MCA102: Concepts of Information Technology

Introduction to Information Technology, Computer Appreciation, Characteristics of computers, Elements of a computer system, Representation of Information, BIT, BYTE , Memory Size, Input/Output and Secondary Storage devices, Networking Concepts - LAN, WAN and topologies, Types of Software, System and Application Software. Popular Operating Systems, Programming Languages Classification, Popular Application Software Packages like word processing and spreadsheet package.

REFERENCE:

1. Learning Word 6 for Windows step-by-step : Rajiv Mathur, Galgotia 1996
2. Learning Excel 5 for Windows step-by-step : Rajiv Mathur, Galgotia 1996
3. P C Software made simple : R.K.Taxali, TMH Publishing Co. Ltd. 1996
4. Computer Concepts and Applications : Donald H Sanders, McGraw Hill, 1988

MCA103: Mathematical Foundation –I-(Discrete)

Set Theory: Sets, Operations on sets, Ordered pairs, Functions , Recursive definitions, Relations, Partially ordered sets, Equivalence relations, Composition of relations, Closures, Lattices.

Groups and Rings: Groups, Sub groups, Homomorphism, Isomorphism and Automorphism, Rings, Fields, Integral Domain.

Logic: Fundamentals of logic, Logical Inferences, Formulae of propositional logic, Predicate Calculus, Quantification.

Recurrence Relations: Recurrence Relations, Linear Recurrence Relations with Constant Coefficients, Homogeneous solutions, Particular solutions, Total Solutions, Solution by the method of Generating Functions.

Discrete Numeric Functions and Generating Functions: Manipulation of Numeric functions.

Elementary Combinatorics: Permutation, Combination, The Principle of Inclusion Exclusion, Pigeonhole Principle, Multinomial Theorem, Binomial Theorem

Boolean Algebra

BOOKS:

1. Elements of Discrete Mathematics : C.L.Liu (McGraw Hill Publications)
2. Discrete Mathematical Structures
with Application to Comp. Sc. : Trembly and J.P. Manohar.
4. Discrete Mathematics for Computer
Science and Mathematicians : Kandel Bakel, Mott.
5. Discrete Mathematical Structures : Kolman, Busby Ross.

MCA104:Digital Electronics and Microprocessor**Unit – 1**

Introduction to Number System, Review of Boolean Algebra. Minimization of Boolean function using Karanaugh Map. Implementation using NAND , NOR gates. Introduction to logic Families.

Unit – 2

TTL logic Circuits : transfer , input and output characteristics. Various types of TTL circuits : Open Collector, tristate, high speed and schottky clamped. rise and fall time of NMOS and CMOS inverter. Dynamic and Static logic.

Unit-3

Combinational systems : Decoders Mux, DeMux adders, digital comparator and parity generator, ALU. Multivibrators (i) Bistable and Schmitt trigger. (ii) Mono stable and A stable Multi vibrator.

Unit- 4

AC coupled capacitive storage and propagation delay flip-flops. Edge Triggered D-Flip Flop. Shift Registers – serial and parallel data transfers. Ripple counters. Synchronous counters- Modulo-N counter design, Up-down counters. Ring Counters and sequence Generators.

REFERENCES:

1. Digital Integrated Electronics, H. Taub and D.Schelling. Mc. Graw – Hill, 1977.
2. Integrated Electronics, Millman and Halkias. Mc Graw Hill , 1970
3. Pulse Digital and Switching Waveforms, J. Millman and H.Tuab. Mc Graw-Hill, 1967.

MCA105: Organizational Structure & Personnel Management

Organizational Structure:

Classical Theories of organization, Scientific Management, Division of Work, Definition of organization. Features of organization, Type of organizational Goals, Official and Operating Goals.

Nature of Organizational Behavior, Comment of Organizational Behavior, Organizational Behavior Knowledge to management practices role of organizational Behavior. **Motivation:** Definition of Motivation, Motivation and Behavior, Theories of Motivation Maslow's need hierarchy, Two-Factor, McClellan's need Theory, Theory X and Y Theory Z.

Personal management:

Personal Function: objectives, principles, Policies, Duties and responsibilities of Personal Manager.

Position of Personnel Department: Line staff relationships, The personnel Department and line Managers, Changing Concept of Personnel Management in India.

Manpower Selection Process: Job Analysis to man specification, Skilled required, Selection Sources of recruitment, Internal Sources, External Sources, Sources of recruitment commonly used in India. Interviewing the Candidate, Types of Interviews.

Nature and Scope of Human Resource Management: Learning Objectives, Scope of Human Resource Management, Function and objective of Human Resource Management. Image and Qualities of Personnel Manger, Personnel Policies and Principles, Human Resources management model.

Training and Development: Learning objective, Nature of training and Development, The Training Process, Training for International Assignments.

BOOKS:

| | | |
|---|---|-----------------|
| Organisational Behavior | : | L. M. Prasad |
| Human Resource & Personnel Management | : | K. Aswathappa |
| Personnel Management & Industrial Relation: | : | Tripathi P. C. |
| Personnel Management | : | Edwin B. Flippo |
| Personnel Management | : | Garry Dessler |

SEMESTER-II**MCA-201: DATA & FILE STRUCTURES USING C**

UNIT I:- Structures, Union, Pointers, file handling

UNIT II :- Representation and manipulation of strings :- Definitions & concepts, string manipulation & pattern matching, storage representation of string, application of string manipulation, application text handling.

UNIT III :- Linear data structure static and dynamic data structure definition & concepts algorithm, algorithms, application of stack & queues, dynamic memory allocation & pointers, linked stacks and queues, linked list operators, storage structures, doubly link list, circular link list, implementation, application polynomial, arithmetic linked list in array, abstract data types & their implementation.

UNIT IV :- Non linear data structure definition & concepts of trees, binary trees operation, representation, linked and threaded binary trees, conversion of general trees to binary, tree transversal, application of trees, formal correspondence, rotation, graphs, terminology and representation transversal, connencted components and spanning tree, shortest path and transitive closure and activity networks.

UNIT V :- Searching tables and sorting notations and concept of sequential search, binary search, searching algorithms and their analysis, tables, tables of various shapes, tables:- a new abstract data type, flashing, analysis of hashing, sorting notations and concepts, insertion sort, selection sort, shell sort, analysis of sorting algorithms , merge sort of linked list, quick sort for contiguous list.

UNIT VI :- External searching & sorting, tree search, tree sort, building a binary search tree, tree height balance AVL trees, heaps and heap sort, priority queue.

UNIT VII :- Recursion :- divide and conquer, postponing the work, principle of recursion, removal of recursion, general methods of removing recursion, recursion removal, non recursive quick sort.

Reference:- 1. Paul Sorenson – Tremblay
2. Crook
3. Horbert & Sahini

MCA-202 : COMPUTER ORGANISATION

Introduction to compilers, hardware generation, number systems :- binary, octal hexadecimal, logic gates, boolean algebra, k-maps, simplification, half-adder, full adder, decoders, multiplexer, binary counter, flip-flops.

Memory organisation, ram, rom, auxiliary memory, virtual memory, cache memory, memory mgmt hardware.

Input output organisation, peripheral devices, I/O interface, direct memory access, types of commands, modes of transfer, asynchronous data transfer, strobe control, handshaking, DMA transfer.

Processor organisation, formats, single, accumulator organisation, general registers, org, stack org, addressing modes, data transfer & manipulation.

References

1. computer organisation :- Vrarvi, Zaky, Hamacher
2. computer system architecture :- Morris Mano.
3. Computer organisation & design :- Patterson

MCA-203: TECHNICAL DOCUMENTATION COMMUNICATION SKILLS

UNIT I :- Definition & role of communication in organisation, process of communication, verbal & non verbal communication, oral and written communication, faultfinder and barrier in organisational and managerial communication.

UNIT II :- Needs of documentation in business:- kinds of documents, reports, memos, circulars, press notes, official correspondence etc, principles of letter writing, comprehension and precise writing, use of computers for documentation process & its advantages.

UNIT III :- Grammar of writing :- sentence, subject & predicate, phrase and clause, parts of speech, tense, active and passive voice, infinite participle, gerund, auxiliaries, noun, adverb, preposition, conjunction, interjection.

UNIT IV :- Mechanics & usage of writing:- Analysis of simple compound & complex sentences, transformation of sentences, synthesis of sentences, direct & indirect speech, agreement of verb with the subject, punctuation and spelling.

UNIT V :- Preparation of document :- Performa press notes, Business correspondence, managerial-reports, project report, feasibility study, need of time mgmt in technical documentation, wordstars, ms word, wordpad, notepad & pagemaker.

References

1. Wren & Martin
2. Thompson & Martinette- A practical english course
3. Bapat & dayar text book of bussiness correspondence
4. Bhende D S Business communication
5. Berrio David Process of communication
6. Steele MS Word 2000
7. Mohan & Meera Banerjee

MCA- 204 Mathematical Foundation – II(Graph – Theory)

1. Graphs- Incident and degree, Hand shaking Lemma, Isomorphism, Subgraphs and Union of graphs.

Connectedness- walks, paths, circuits, components, connectedness algorithms, shortest path algorithms, Eulerian graph, Fleury's algorithms, Chinese Postman problem, Hamiltonian graph (necessary condition & sufficient condition), Travelling salesman problem, Bipartite graphs.

2. Trees- properties of trees, pendent vertices in a tree control tree, rooted and binary trees, spanning trees, spanning trees algorithms, fundamental circuits, spanning trees of a weighted graphs, cut- sets and cut-vertices, fundamental cut sets, connectivity and separatively, networks flows, max- flows, min-cut theory.

3. planar graphs- combinational and geometric duals, Kuratowski- graphs, Detection of planarity. Colouring Graphs- Chromatic numbers, Chromatic polynomial, the six and seven color theory, four color problem.

Directed graph- Binary relation, Directed graphs and connectedness, directed trees, arborescence, Polish method.

counting of levels trees- Cayley's theorem, counting methods, Pólya's theorem.

Application of graph in computer science

Automata Theory- Introduction to automata and languages, Deterministic and Non Deterministic Finite state machines, Regular Grammar, Regular Expressions, Context free Languages and their properties, Introduction to Turing machine.

References:

Graph theory: 1. P. Hall

2. Narsingh Deo

Theory of computer science- K.L.P. Mishra

MCA-205: Object Oriented Programming Using C++

Introduction To Object Oriented Design And Oops.

Basic Concepts: Objects, Class, Instances, Encapsulation, Information Hiding, Polymorphism, Inheritance, Object Oriented Issues.

Programming In C++ : Variables In C++ , Simple I/O, Class Data Types, Derived Classes, Using Functions In C++ , Overloading Operators, Class Inheritance, C++ Library, Template In C++, Exception Handling.

Books & References

1. Robert Lafore – Programming In C++
2. H.Schild – The Complete Reference C++
3. Balagursamy – Programming In C++

MCA – 301 DATA BASE MANAGEMENT SYSTEM

Data base system concepts and architecture, data model schema and instances data independence and data base language and interface. Data definition 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 ER diagram to tables extended ER model, relationship of higher degree.

Relationship Data Model and Language:

Relationship data model concepts, integrity constraint keys, domain constraints referential integrity assertion triggers, foreign key, relation algebra, relation calculus, tuple and domain calculus, Sql, data definition queries and updates in SQL.

Example DBMS System (Oracle 8)

Basic architecture data definition and data manipulation, ISQL, PL, SQL, cursors, Triggers, Stored Procedures etc.

Data Base Design :

Functional dependencies, normal forms, first, second and third normal forms BCNF, multivalued dependencies fourth normal forms join dependencies and fifth normal forms Inclusion dependencies loss less join decomposition normalization using FD MVD and JDs, alternative approaches to database design

Transaction processing concepts:

Transaction system, schedule and recoverability, Testing of Serializability, Serialization of schedules, conflict & view serialization schedule.

Concurrency Control Techniques:

Locking Techniques for concurrency control, Time stamping protocols for concurrency control.

SUGGESTED BOOKS & REFERENCES:

- Majumdar & Bhattacharya “ Data base Managements System” TMH
- Korth, Silbertz Sudarshsan “ database concepts”, GMC Graw Hill
- Elmasari Navathe “fundamental of data base systems” addition Wesley
- Date CJ “ An introduction of data base system” addition Wesley
- Ramakrishnan .Gehkre “ Database Management System” McGraw Hill

● **MCA – 302****OPERATING SYSTEM****INTRODUCTION:**

Operating system and function, the evolution of operating system, batch, iterative, time sharing and real time system, system protection, operating system structure, system components, system structure, operating system services.

Concurrent Processes:

Process concept, Process state transition, interrupt, principle of concurrency, the producer/ consumer problem the critical section problem, semaphores, classical problem in concurrency, toner processes communication, process generation, process Scheduling.

CPU Scheduling:

Scheduling concept, performance criteria, Scheduling algorithm, Evolution, multiprocessor scheduling, multiprocessor Organization.

Deadlock :

System model, deadlock, characterization, prevention, avoidance, and detection, recovery from deadlock combined approach.

Memory Management:

Real Storage, Rresident Monitor, multiprogramming with fixed partition, multiprogramming with variable partition, multiple base register, paging, segmentation, pagedsegmentation virtual memory concept, demand paging, performance, paged replaced algorithm, allocation of frames, thrashing, cache memory organization impact on performance.

I/O Management & Disk Scheduling:

I/O devices and the organization of the I/O function, I/O buffering, disk I/O, Operating system design issues.

Case Study of Unix Operating System.

SUGGESTED BOOKS AND REFERENCES:

- Dietal , "An Introduction to Operating System ", Addition Wesley
- Milenekovic, " Operating system concepts", McGraw Hill
- Peterson, " Operating System". Addition Wesley
- Tennenbaum, " Operating system design and Implementation", PHI
- Gary Nutt, " Operating system, A Modern perspective ", Addition Wesley
- Stallng, Willium, " Operating System" Maxwell Macmillan
- Silverschatza. Peterson J, " Operating System Concepts ", Willey

MCA – 303

MANAGERIAL ECONOMICS

Managerial Economics

Meaning nature and scope of managerial economics, Micro economic theory of consumer behavior, Decision making process, Concept of demand, Law of demand and elasticity of demand and demand forecasting.

Cost Concept, Cost-Output relationship, production decisions managerial use of cost function.

Price-output decision under different market condition pricing policies and methods.

Nature and concept of profit in managerial economics.

MCA304**Design and Analysis of Algorithms****Course Details**

Notion of an algorithm, Big oh, small oh, Theta and omega notations, Space and Time Complexities of an algorithm,

Recurrences: Substitution method, Master method and Iterative method.

Concept of Randomized algorithms.

Fundamental Design Paradigms-

Divide & Conquer – Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Heap Sort, Strassen's matrix multiplication

Greedy Method – Fractional Knapsack problem, Optimal storage on the tapes, Job sequencing with deadlines, Optimal Merge patterns, Huffman Codes, Tree vertex splitting problem, Prim's algorithm, Kruskal's algorithms, Dijkstra algorithm.

Dynamic Programming: 0/1 Knapsack problem, All pair shortest path problem, String editing problem, Traveling salesperson problem, Matrix chain multiplication, The Bellman-Ford algorithm.

Basic Traversal Techniques: Techniques for binary search tree, Techniques for graphs, Topological sort.

Backtracking: The general method, 4-queen problem,

Theory of NP completeness polynomial time, polynomial time verification, NP Completeness and reducibility

NP complete problems: Satisfiability problem, clique problem, vertex cover problem, Subset-sum problem, hamiltonian cycle problem, independent set problem.

Approximation algorithms: Performance bounds for approximation algorithms, Vertex cover problem, Traveling salesperson problem and the Set-covering problem.

● MCA-305

Software Engineering**Unit 1st :**

Introduction to Software engineering, importance of software, the evolving role of software, software characteristics, software components, software application, software crisis, software engineering problems, software development life cycle software process.

Unit 2nd :

Software requirement specification: analysis principles, water fall model, the incremental model, prototyping, spiral model .

Unit 3rd :

Software project management: the management spectrum:- (the people ,the product ,the process, the project),cost estimation project scheduling, staffing, software configuration management, structured vs. unstructured maintenance, quality assurance project monitoring, risk management.

Unit 4th :

Software design: design principles, problem partitioning, abstraction, cohesiveness, coupling

Unit 5th :

Testing :testing principles ,levels of testing, functional testing, structural testing, test plan, test case specification, reliability assessment, software testing strategies, verification and validation, unit testing, integration testing, alpha and beta testing, system testing..

Unit 6th :

Software reliability & quality assurance: reliability issues, reliability metrics, reliability growth modeling, software quality ISO 9000 certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM.

Suggested Books & References

Pressman roger "software engineering"

SEMESTER-IV**MCA-401: DATA COMMUNICATION AND NETWORKS**

Introduction : History And Development Of Computer Networks, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Networks Topology Iso/Osi Seven Layer Architecture, Connectionless Versus Connection Oriented.

Physical Layer: Transmission Media, Analog Transmission, Digital Transmission.

Data Link Layer: Framing Error Detection And Correction CRC, Hamming Code, Stop And Wait Protocol, Sliding Window Protocols , HDLC Protocol, PPP.

Mac Layer : Aloha Protocols Csma/Cd: Ethernet, Logical Link Control, Bridges And Switches, Ethernet, Switched ethernet, Fast Ethernet, FDM, TDM, Gigabit ethernet, Collision free Protocols.

Network Layer : Virtual Circuit, Datagrams, Routing Algorithms Shortest Path, Distance Vector, Link State Routing, Flooding, Heirarchical Routing, Congestion Control Algorithms. Multicasting, Inter Network Protocols (Ip) -- Header Structure, Addresses. Option, Etc. Classless Inter Domain Routing , Introduction ICMP, ARP, RARP, DHCP.

Transport Layer : Flow And Error Control, Multiplexing, Establishing And Releasing A Connection, Transmission Control Protocol – Header, Services, Connection Management, Convention Control M, Sliding Window, Timers. User Datagram Protocol, Domain Name Services.

Application Layers, Example Protocols: Email (SmtP) DNS, Cryptography , Network Managements : Sntp.

Text Books:

1. A.S. Tannenbaum, Computer Network, Forth Edition, Phi 1996
2. Shallings – Data Communicaion And Networks.
3. Behronz A . Forouzen – Data Communication And Networks. (Tmh)

MCA- 402: Business Organization and Accounting Principles**Unit-I**

Introduction: Definition Features And Scope Of Accounting : Importance Of Accounting Information To Different Parties, Accounting Concepts , Conventions And Standards.

Accounting Process And Systems: Double Entry System- Journal, Ledger And Trial Balance, Familiarity With And Use Of Standard Accounting Package(Ex And Tally).

Unit-II

Concepts And General Format Of Financial Accounts And Statements: Capital And Revenue Items, Profit& Loss Account And Related Concepts, Balance Sheet And Related Concepts , Accounting Ratios.

Unit-III

Planning Funds Requirements: Nature And Objectives Of Financial Management, Introductory Idea About Capitalisation, Capital Structure.

Unit-IV

Source And Forms Of Finance: Shares And Debentures, Marketing Of Securities, New Issue Activities In India, Current Development In Indian Stock Markets- Paperless Screen Based Trading, Depository Services, Impact Of Internationalisation.

Unit-V

Working Capital Management: Concepts And Components Of Working Capital, Factors Influencing The Composition Of Working Capital, Objectives Of Working Capital Management-Liquidity Vs. Profitability And Working Capital Policies.

Introduction To Components Of Working Capital Management: Cash Management, Inventory Management And Receivables Management.

Suggested Readings:

- Maheshwari, S.N.: Financial Accounting
Jain & Narang : Fundamentals Of Accounting
Shukla & Grewal : Advanced Accounts
Pandey.I.M. : Financial Management
Chandra. P. : Financial Management
Reisner : Ms-Excel- 2000

MCA 403:Mathematical Foundation-III
(Computer oriented numerical method)

Numeric Computation:

Computer Arithmetic: Floating point numbers-operations. Normalizations and their consequences

Iterative Methods: Zeroes of a single transcend equations and zeroes of polynomials using bisection, false position, Newton-Rapson, Secant method of successive approximation, convergence of solution.

Simultaneous Linear Equations: Solution of simultaneous linear equations- Gauss elimination method and pivoting, III- conditional equations and refinement of solution; Gauss- Seidal iterative method.

Numerical Differentiation and Integration: Numerical differentiation, Numerical integration: Simpson 1/3rd rule, Trapezoidal rule, Numerical solution of ordinary differential equations: Runge-Kutta method, Predictor- corrector method (Euler's modified method), Higher order differential equation.

Interpolations : Polynomial Interpolation- Newton Method , langranges' Method Difference table.

Statistical Computation:

Frequency Charts: Different frequency charts.

Regression Analysis: Linear regression, Polynomial regression and non linear regression (Fitting a geometric curve, exponential curve, hyperbola, trigonometric function)

Statistical Quality control Methods: Test of significance, χ^2 (Chi square test) and F test.

BOOKS:

Str, Bullrich: Computer Oriented Numerical methods, Springer Vertap, 1980

Krishnamurthy, E.V.Sen, S.K., Computeroriented approach, Academic Press, Inc.1978.

Rajaraman V.: Computer Oriented Numeric Methods, Prantic Hall India198

MCA 404: INTERNET AND JAVA PROGRAMMING

Unit Ist :

Overview Of OSI References Model, Topology Design, Media Access Control Level ,
Overview of Client Server Model.

Unit IInd :

Introduction to JAVA Programming, Operator Data Type , Variables, Methods & Classes,
Inheritance Packages and Interfaces Exception, Multithreaded Programming, I/O , Java Applets

Unit IIIrd :

String Handling, Input Output Exploring Java , Applets Classes, Event Handling, Introduction
To Awt, Working With Windows Graphics, Awt Controls.

Unit IVth :

Introduction to Java Beans, Java Swing, Java Servlets, JDBC.

Unit Vth :

Introduction to E-Commerce, B to B e-Commerce, B to C e-Commerce

Suggested Books & References

1. Conhert, "Internet 101" Addison Wesley
2. Rebelsky, "Experiments In Java" Addison Wesley
3. Balaguruswamy, "Programming In Java" Tmh
4. Naughton Schildt, "The Complete Reference Java 2" Tmh
5. Arnold, "The Java Programming Language", Addison Wesley
6. Decker, "Programming Java" Vikas

MCA-405:Advanced Unix and Shell programming

Overview Of Unix Architecture – Kernel: Processes; Time Sharing, Shell Files And Directories, Creation Of A File, Inode Numbers And Filenames , File Security, File Systems, Peripheral Devices As A File

Unix Editors And Basic Unix Commands – Vi Editor, Redirections, Piping, Tees , Filters, Unix Utilities : Grep, Sed, Awk, Tar Etc.

~~Shell Programming – Bourne Shell, C Shell, Shell Variables, Scripts, Initialization~~
And Environment, If And Case Statements, For , While And Until Loops

Awk Programming – Awk: Pattern Scanning And Processing Language Begin And End Patterns, Awk Arithmetic And Variables, Array And Strings.

Introduction To System Administration – The System Administrator And His Functions.