

MCA (OLD SYLLABUS)

Semester I

MCA – 101 Computer Fundamentals & Digital Electronics (Max. Marks 100)

- **UNIT I**
History of Computers, Functioning of Computer Systems, Components of Computer System, I/O Storage Devices, CPU, Processor, Computer Arithmetic and Boolean Algebra.
- **UNIT II**
Boolean Functions, K-Map and Application, Logic Gates, Logic Families, DTL, TTL, ECL, NMOS, PMOS, CMOS Gates, Half & Full Adder, Multiplexer & Demultiplexer, Flip Flops, R-S, J-K, & T Flip Flops.
- **UNIT III**
Applications of Counters & Registers, Introduction to Data Communication & Network-LAN, MAN, WAN, Topologies, Internet, Introduction to Operating System-DOS/WINDOWS, Computer Software, Elements of Computer Software, System Software.
- **UNIT IV**
Flowcharts & Algorithms, Programming Languages and Their Evolution, Level and Classification of Programming Language-Machine, Assembly & High Level Languages, A General Overview of IT and Its Applications, Computers in Total IT Perspective.

MCA – 102 Object Oriented Programming & C++ (Max. Marks 100)

- **UNIT I**
Overview of Object Oriented Modeling, Object and Dynamic Modeling, Functional Modeling, System and Object Design, Comparison of Existing Methodology.
- **UNIT II**
Programming Style in Object Oriented Language, Origin of C++, Classes and Objects, Arrays, Pointers and References.
- **UNIT III**
Functions and Operator Overloading, Inheritance, Virtual Function and Polymorphism, C++ I/O, System Basics, C++ files I/O, Array based I/O.
- **UNIT IV**
Templates and Generic Programming, Exception Handling, C++ Applications.

MCA – 103 Mathematical Foundation for Computer Science (Max. Marks 100)

- **UNIT I**
Set Theory Relation & Functions, Lattices, Groups & Rings, Subgroups, Fields, Homomorphism, Isomorphism, Automorphism, Discrete Numeric Function and Generating Functions.
- **UNIT II**
Boolean Algebra, Mathematical Reasoning, Propositional, Predicate, Qualifiers, Logical Operators.
- **UNIT III**
Introduction to concept of Automata and Formal Languages, Non deterministic and deterministic Finite State Machines. Construction of DFA from NFA, State minimization of DFA.
- **UNIT IV**
Introduction to regular set, Regular Grammar and Context free language & Grammar. Introduction to turing machine.

MCA – 104 System Analysis & Design (Max. Marks 100)

- **UNIT I**
Decision Making Process, Role of Information, Overview of Systems Analysis and Design, System Development Life Cycle (SDLC).
- **UNIT II**
Preliminary Investigation, Feasibility Study-Technical. Economic and Operation, Cost/Benefit Analysis, Requirement Capturing and Specification Using Use cases and Activity Diagram.
- **UNIT III**
Documentation, Relation, Association, Aggregation, Sequence Diagram and Collaboration Diagram, State Chart Diagram.
- **UNIT IV**
Object Modeling, Hardware and Software Selection. Implementation using Object Oriented Programming Language.

MCA – 105 Computer Based Numerical & Statistical Techniques (Max. Marks 100)

- **UNIT I**
Floating Point computation, Floating Point Numbers, Machine Epsilon, Sensitivity of Problem and Instability of Certain Algorithms. Errors and Their Propagation in Numerical Computation. Concepts of Convergence and Stability of Algorithm.

- **UNIT** **II**
 Roots of Algebraic equation. Interpolation and Approximations. Interpolating Polynomials and its Construction using Lagrangian method and Method of Divided Differences. Integrated Interpolation. Inverse Interpolation. Spline Functions and Their Uses.
- **UNIT** **III**
 Newton and Guassian Quadrature Method. Integration Formulate Using Finite Differences. Romberg Integration, Direct Solution of Linear Systems, Linear System for Stored Matrices, Condition of the Matrix. Large Sparse Systems. Guass Elimination, Triangular Decomposition, Eigen Values and Eigen Vectors, Singular Decomposition, Solutions to ordinary differential equations- Taylor series, Euler Method, Modified Euler Method, Runge Kutta Method.
- **UNIT** **IV**
 Measure of Central Tendency and Dispersion, Probability Theory, Random Variables, Expectations and Variance, Specific, Distributions, Binominal, Poison, Geometric, Uniform, Exponential, Normal Distributions, Higher Dimensional Random Variables. Linear Regression, Least Square Method, Rank Correlation, Coefficient of Correlation Ratio. Concepts of Population and Sample Parameter & Statistic, Testing of Hypothesis, Chi Square F, t tests, Implementation of Methods in C++.

MCA – 106 Software Lab – I (Max. Marks 100)

- Practical on paper MCA - 102

MCA – 107 Software Lab – II Max. Marks 100)

- Practical on paper MCA – 105

Semester II

MCA – 201 Discrete Structure (Max. Marks 100)

- **UNIT** **I**
 Basic Counting Principle, Permutations and Combinations, Inclusion – Exclusion,

Principle Generating Functions and Recurrence Relations. Combinations Identities Graph Coloring Problems, Finite Designs Systems of Distinct Representative and Matching Problems in Graphs.

- **UNIT** **II**
Potential Applications in Social, Biological & Physical Seminars, Puzzles, Graphs Adjacency and Incidence Material Described and Unindirected, Eulerian Chains and Cycles, Hamiltonian Chains and Cycle Trees.
- **UNIT** **III**
Chromatic Number, Connectivity and Other Graphical Parameters, Applications, Sets and Functions-sets, Relations Functions, Operations, Equivalent Relations, Relation of Partial Order, Partitions, Binary Relations.
- **UNIT** **IV**
Monoids and Groups, Semigroups and Monoids, Cycle Semigroups and Sub Monoids, Subgroup and Cosets, Congruence Relations, Semigroups, Morphisms, Normal Subgroups, Direct Product, Morphism, Boolean Sub Algebra, Boolean Rings, Applications of Boolean Algebra in Logic Circuits and Switching Functions, Implementation in C++.

MCA – 202 Computer Oriented Optimization Techniques (Max. Marks 100)

- **UNIT** **I**
Linear Programming – Graphical, Simplex, Two phase & Big M Methods, Dual Linear Programming- Dual of a Problem, Dual Simplex Method.
- **UNIT** **II**
Transportation Methods – North West Corner, Least Cost, VAM Methods, Optimal Solution by Modi & Stepping Stone Method, Assignment Problem.
- **UNIT** **III**
Queuing Theory, Inventory Control – EOQ, Price Break, Production Inventory Model, Lead Time, Inventory Control System, Inventory Models, Network Analysis – Time Estimation, PERT and CPM, Statistical Quality Control.
- **UNIT** **IV**
Game Theory, Integer and Dynamic Programming, Quadratic Programming, Goal Theory, Simulation and Forecasting Techniques, Implementation of Methods in C++.

MCA – 203 Principles of Management (Max. Marks 100)

- **UNIT** **I**
Concept of Management: Present Pattern of Development in Business and Industry, Need for Principles of Business Management, Management Functions.

- **UNIT** **II**
Unification of Diverse Specialised Activities, Planning, Policy Making, Authority and Responsibility, Organising Coordination, Motivation Direction and Control, Managerial Objectives and Criteria of Management.
- **UNIT** **III**
Organisation Structure and Relationship: Types, Basis, Functions, Regions, Operations, Products, Customers, Delegation, Specification, Duties, Authority, Accountability, Staffing and Job Specification, Communications.
- **UNIT** **IV**
Execution of Policy, Management Practice in Public Enterprise and Public Utility Under Takings, Public Relations, Government Departments, Local Authorities, Chambers of Commerce, Trade Unions, Public Relations Department.

MCA – 204 Computer Architecture (Max. Marks 100)

- **UNIT** **I**
Computing and Computers: Nature of Computing, System Design, Register Level, Processor Level.
- **UNIT** **II**
CPU Organisation, Data Representation, Instruction Set, Fix Point Arithmetic, Logic Circuit, Advance Topic, Micro Program Control, Pipe line Control, I/O System Controls, Parallel Processing.
- **UNIT** **III**
Memory Technology, Memory System, Caches, Communication Methods, Number representation and Arithmetic, Memory Control, Arithmetic and I/O Units of a Computer.
- **UNIT** **IV**
Instructions and their Format, Representations of Data, Processor Components, Microprogramming, I/O Structures, Interrupt Memory organizations, Examples of Organizations of Main, Mini and Micro system.

MCA – 205 Data Base Management System (Max. Marks 100)

- **UNIT** **I**
Introduction to Data Base Techniques, Difference Between a File System and a Data Base System, Goal of DBMS Including Data Independence, Consistency, Data Security and Integrity.
- **UNIT** **II**
DBMS Models. Hierarchical, Network and Relational.,Object Oriented, Data Description and Query Language, Physical Data Base Design.

- **UNIT** **III**
Introduction to Distributed, Temporal, Active, Deductive, Parallel, Special, Multimedia Data Base, Concurrency Control Crash Recovery etc.
- **UNIT** **IV**
Comparison of Various Data Base Models Like Networking, Hierarchical, Relational Object Oriented Models, Data Base Software Selection, Data Base Management System. Applications in ORACLE with 4 GL (SQL & PL).

MCA – 206 Software Lab – III (Max. Marks 100)

- Practical on paper MCA - 202

MCA – 207 Software Lab – IV Max. Marks 100)

- Practical on paper MCA – 205

Semester III

MCA – 301 Accounting & Financial Management (Max. Marks 100)

- **UNIT** **I**
Classification and Coding of Accounts-Source of Capital, Liabilities and Net Worth of a Business, Methods of Obtaining Finance from Public and Private and Internal and External Sources, Long and Short Term Loans, Secured and Unsecured Advances, Credit Instruments, Cost of Obtaining Capital, Forms of Capital Structure.
- **UNIT** **II**
Planning and Assessment of Capital Requirement, Fixed Assets, Current Assets, Liquid Resources, Forecast of Business Activity, Requirement of Working Capital, Cash Flow, Investment of Capital, Investment in Own Business and in Business or Subsidiaries, Trustee Securities, Investment in Companies Quoted in Stock Exchange, Investment Trusts.
- **UNIT** **III**
Valuation of Fixed and Current Assets and Goodwill; The effect of Changing Price Levels, Control of Capital Employed: Provision, Replacement and extension of fixed and current assets; Necessity for sound capital investment policies; Determination of priorities for capital projects; Methods of Assessment and

Evaluation of Profitability of capital investments; Forest authorization recording and control of capital expenditure; Return on Capital employed; Control of the levels of the stocks and work progress.

- **UNIT** **IV**
Credit Control and Realization of Debtors; Debtors and Creditors; Investigation of Customer's credit standing; Realization of Sundry Debtors; Credit Allowed by Vendors case and trade discount payable and receivable. Profit and Profit Planning Distribution ploughing back of profit. Reports Design and Content of Annual Reports and Accounts; Criticism and interpretation of published accounts, Accounting and Statistical data.

MCA – 302 Data Structure (Max. Marks 100)

- **UNIT** **I**
Introduction to Data Structure, Types, Charting Structure, Linear List, Sequential and Link Allocation, Inverted Files, Multitrees, Digital Search Tree.
- **UNIT** **II**
Sorting and Searching – Bubble, Quick, Batch, Shell, Reduce Sorts, Sorting Networks, Merging and Sorting on Disk Files.
- **UNIT** **III**
Binary, Linear Tree, Last Search Techniques, Different Techniques of Key to Address Transformation, Threaded Tree, AVL Tree, Forests, Symbols Table Structure, Practical Applications.
- **UNIT** **IV**
Over Flow Management Procedures for Updating Files, Information Retrieval, Report Generation, Validation of Data Time and Space Estimate for Data Processing Processes and The Use of Peripheral Storage Devices Including Tapes, Disks, Drums and Application of Algorithms in C++.

MCA – 303 Software Engineering (Max. Marks 100)

- **UNIT** **I**
Introduction to Software Engineering, Software Development and Life Cycle, Project Size and Its Categories, Planning a Software Project, Project Control and Project Team Standards, Design of Solution Strategies, Software Cost Estimation and Evaluation Techniques.
- **UNIT** **II**
Software Design, Various Design Concepts and Notations, Modern Design Techniques, Verification and Validation Methods, Documentation and Implementation.

- **UNIT** **III**
Software Reliability, Definition and Concept of Software Reliability, Software Errors, Faults, Repair and Availability, Reavailability and Availability Methods.
- **UNIT** **IV**
Structured Vs. Object Oriented Approach, Use of Data Base as Study Tools, Modern Programming Introduction of Object Oriented Languages and Explanation Concepts Such as Data Abstraction, Inheritance, Exception Handling, Concurrency Mechanism, etc. Software Development Environments, Modern Trends in Software Engineering.

MCA – 304 Digital Hardware Design (Max. Marks 100)

- **UNIT** **I**
Digital Hardware Elements and Their Description in Hardware Description Language, System Structuring Methodology.
- **UNIT** **II**
Hardware, Software and Firmware Considerations in Designing Control Units for Arithmetic and Logic Processors.
- **UNIT** **III**
I/O Processors with Different Methods of Data Handling, Stored Program Control, Electronic Switching, Telecommunication as Telecom and Processors, Process Interface.
- **UNIT** **IV**
Design such as Numerical Control Data Acquisition System Programmed Logic Controllers, Programmed Logic Arrays Designing with PLAs; Microprocessor base System Design, Technology Considerations in System Design.

MCA – 305 Programming in Visual C++ (Max. Marks 100)

- **UNIT** **I**
Introduction to Visual C++, Data Base and Controls, Window based Common Control, Message and Command.
- **UNIT** **II**
Drawing on the Screen, Printing and Print View, Persistence and File I/O, Building a Complete Application Using Active X, Server Application, Automation Server, Active X Control
- **UNIT** **III**
Socket and MAPI, Winlnet Classes, Internet Active X, Template Library, Data Base Access, Developer Studio, Windows Programming.

- **UNIT** **IV**
Debugging MFC, Macro and Global URL and Monikers, Multitasking and Windows thread, Exception Templates, Logo Magic and Instant Magic, Latest Application in Visual C++.

MCA – 306 Software Lab – V (Max. Marks 100)

- Practical on paper MCA - 302

MCA – 307 Software Lab – VI Max. Marks 100)

- Practical on paper MCA – 505

Semester IV

MCA – 401 Data Communication & Computer Networks (Max. Marks 100)

- **UNIT** **I**
Digital Communication: Fundamentals of digital Communication, Communication Channel, Measure of Information, encoding of source output, shannon's algorithms. Discrete and continuous channel Entropy acoling, variable length code.
- **UNIT** **II**
Data compression shannonhatnly theorem. Transmitter, Channel noise, Amplitude Modulation. Frequency Modulation, Sampling, Pulse Modulation, PWM, PDM, PPM, PCM, Compression & Codes: Scheme coherent and non coherent detector, probability of error.(pe), performances analysis and compression. Error detection and correction codes.
- **UNIT** **III**
Baseband Data Transmission: Basednad pulshaping, Inter symbol Interface (ISI), Dubinary Baseband PAM System many signalling schems, equalisation. Synchronization and Scrambler and unscramble. Bandpass data transmission system ASK, PSK, DPSK, MSK modulation, Linear Block encoding algebraic codes Cyclic codes Best error, corroding codes performance of codes.
- **UNIT** **IV**
Networking Goals and Application, Network Structure, Packet Switching Versus Circuit Switching, Broadcast Channels, Interface Message Processor, Hardware, Network Software Design, Protocol Hierarchy, Open System Inter Connection

Reference Model Physical. Data Link, Network, Transport and other Layers, Satellite Links, Local Area Network, Bus and Ring Architectures, Use of Object Oriented Technique in Network. Device Drivers, TCP/IP, Client Server Architecture, Two Tier Architecture and n Tire Architecture.

MCA – 402 Computer Graphics & Animation (Max. Marks 100)

- **UNIT I**
Graphics Display Devices, Interactive Devices, Line and Circle Plotting Using Bresenham's Algorithm, Windowing and Clipping, Sutherland Cohen Approach, Cyrus Beak Method, Midpoint Subdivision Algorithm, Curve Drawing, Hermit Polynomial.
- **UNIT II**
Bezier Curves, B-splines, Picture Transformation, Scaling Mirror Images, 2D & 3D Graphics, Coordinate System, 3D Transformation, Rotation about an Arbitrary Axis.
- **UNIT III**
Orthogonal Projection, Multiple Views, Isometric Projections, Perspective Projections, 3D Clipping, Hidden Surface Removal, Curved Surface Generation, Generation of Solids, Sweeps Method, Interpolation, Illumination Model, Ray Tracing.
- **UNIT IV**
Shading, Transparency, Shadows, Textures Colors, CGS Modelling, Graphic Standards GKS, PHIGS, Animation Fundamentals- Control and Sequencing, Creating, Sealing and Saving Frames, Synchronising Frames, Audio-Video Editing, Implementation in C++.

MCA – 403 Operating System (Max. Marks 100)

- **UNIT I**
The Functions of Operating System, Basic Concepts, Batch Processing, Multiprogramming, Memory Management – Static and Dynamic Time Sharing, Memory.
- **UNIT II**
Information management- files, and file system, file system characteristics, access and allocation methods, Disk management, disk scheduling, I/O, Processor and Concurrent Process, Scheduler, Scheduling algorithms.
- **UNIT III**
Synchronization of Process, Mutual Exclusion algorithm, Semaphore, File Management, Classical examples on Semaphore, Security and Protection Issues,

Distributed Operating Systems Algorithms, Multi Processor and Multitasking, Examples of Simple Operating Systems and Job Control Language.

- **UNIT** **IV**
Overview of UNIX Operating System, UNIX System Architecture, Basic UNIX Commands, The UNIX Editor-ed & vi. The UNIX Utilities, The UNIX-C Interface, UNIX System Calls and “C” Library Functions. Introduction to Windows XP.

MCA – 404 Management Information System & E-Commerce (Max. Marks 100)

- **UNIT** **I**
Information Technology and Business, Use of Computer Based Information Systems in Different Functional Areas.
- **UNIT** **II**
Computer Based Sales Information Systems, Inventory Control Systems, Accounting Information Systems, Personnel Information Systems.
- **UNIT** **III**
E-commerce and Elements, PC’s and Networking, Email, Internet & Intranet, Electronic Marketing, EDI, UN / EDI facts.
- **UNIT** **IV**
ERP, Consumer Trade Transaction, Internet Bandwidth & Technology, Security Issues, Business Process Reengineering, Management of Change, Legal Issues, E-Commerce in India.

MCA – 405 Analysis & Design of Algorithm (Max. Marks 100)

- **UNIT** **I**
Introduction: Algorithms, Analysis algorithms, Designing algorithms. Mathematical Foundations: Growth of Functions, Summation Recurrence, Sets, Counting & Probability. Sorting and Order Statistics: Heapsort, Quicksort, Sorting in Linear time, Medians and Order Statistics.
- **UNIT** **II**
Data Structure: Elementary Data Structure, Hash Tables, Binary Search Trees, Red Black Trees, Augmenting Data Structure. Advanced Design and Analysis Techniques: Dynamic Programming, Greedy Algorithms, Amortized Analysis.
- **UNIT** **III**
Advance Data Structure: B-Trees, Binomial Heaps, Fibonacci Heaps. Data Structure for Disjoint Sets. Graph Algorithms: Elementary Graphs Algorithms, Minimum Spanning Trees, Single - Source Shortest Paths All- Pairs Shortest Paths. Maximum Flow.

- **UNIT** **IV**
Selected Topics: Sorting Networks, Arithmetic Circuit, Algorithms for Parallel Computers, Matrix Operations, Polynomials and the FFT. Number - Theoretic Algorithms, String Matching, Computational Geometry, NP - Completeness, Approximation Algorithms.

MCA – 406 Software Lab – VII (Max. Marks 100)

- Practical on paper MCA - 402

MCA – 407 Software Lab – VIII

- Practical on paper MCA – 405

Semester V

MCA – 501 Principles of Compiler Design (Max. Marks 100)

- **UNIT** **I**
Introduction to Compilers and Translators, Phases of compiler, Regular expressions, Finite State Machines, Push Down Machines and Their Application, tokens, Lexical analysis, Symbol Tables organization.
- **UNIT** **II**
Intermediate codes: Internal Forms of Source Program, Semantic Analysis, intermediate code forms, syntax directed translations, Error Detection Recovery.
- **UNIT** **III**
Code Optimization: types, local, loop optimization, use of data flow analysis.
- **UNIT** **IV**
Code Generation: features and problems of code generation, code generation through GETREG, DAG, Use of Object Oriented Concepts in Compiler Construction.

MCA – 502 Internets & Web Programming (Max. Marks 100)

- **UNIT** **I**
Introduction of World Wide Web, Web Protocol, Introduction to HTTP, Understanding the HTML & DHTML.

- **UNIT** **II**
Web servers, and web browsers, types of web servers, Writing Web Server, Writing Web Browser.
- **UNIT** **III**
Expansion of Web Browser, Web Robots, Agents & Wanderers, Introduction to XML, Understanding the CGI & Perl, CGI Scripts with Perl.
- **UNIT** **IV**
Web Programming using Java & Java Script, Web Programming using VB Script & Active X.

MCA – 503 Multimedia Information Systems (Max. Marks 100)

- **UNIT** **I**
Multimedia Definition Abstract and Digital Media, Multimedia Environment, Multimedia in Business and Work. Multimedia Hardware, Memory and Storage Devices, Multimedia Objects, Tools for Object generations, Video Sound, Image Capturing, Authoring Tools, Card and Page based Authoring Tools.
- **UNIT** **II**
Text, Sound, Midi, Audio Analog and digital Video, Audio File Format, Midi under Windows Environment, Audio & Video Capturing. Multimedia Information Distribution, Multimedia Platform, Multimedia Document Management.
- **UNIT** **III**
Huffman Coding for Data Compression, Adaptive Coding, Arithmetic Coding, Compression Ratio, loss less & Lossy compression. Sampling Variables for Speech Compression, Lossless Compression of Sound, Lossy Compression & Silence Compression.
- **UNIT** **IV**
Bitmaps, Vector drawing, Lossy Graphic Compression, Image File formation, Animations, Images standards, JPEG Compression, Zig Zag Coding. Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standards, recent development in Multimedia.

MCA – 504 Artificial Intelligence (Max. Marks 100)

- **UNIT** **I**
Artificial Intelligence- definition, history and growth, the Turing test and its significance. Branches of AI and applications Problem solving, production system and control strategies.
- **UNIT** **II**
State Searching – informed and blind searches, algorithms A* and AO* and Related

Algorithms, AND, OR Graphics and AO* Constant Satisfaction Problems and Their Solution Techniques, Knowledge Representation, Propositional logic, first order predicate, other forms of KR.

- **UNIT** **III**
Uncertainty considerations, Expert Systems, Architecture of Expert System, Rule Based Systems, Knowledge Acquisition, Planning Frame Problem, Hierarchical Planning, Case Based Planning.
- **UNIT** **IV**
Programming in List and Prolog, Introduction to Distributed & Introduction to Applications of AI in Natural Language Processing, Computer Vision, Neural nets and Non-mnemonic Logic. Design of Expert System using Programming Language.

MCA – 505 One Elective Paper (Max. Marks 100)

MCA – 506 Software Lab – IX (Max. Marks 100)

- Practical on paper MCA - 502

MCA – 507 Software Lab – X Max. Marks 100)

- Practical on paper MCA – 504

Semester VI

MCA - 601 Industrial Training and Project (Max. Marks: 500)

MCA - 602 Viva - Voce of Project (Max. Marks: 200)

List of Electives

- Neural Network
- Pattern Recognition
- Digital Signal Processing
- Robotics
- Advance Database Management System

Neural Network

- **UNIT I**
Introduction and Motivation, Biological Neural Network and Simple Models, The Artificial Neuron Model, Hopfield Nets, Energy Functions and Optimization.
- **UNIT II**
Perceptions and Threshold Logic Machines, Multilayer Networks – Their Variants and Applications, Capacity of Multilayer Networks.
- **UNIT III**
Back propagation Recurrent Nets, Tree Structured Networks, Unsupervised Learning, Hebbian Learning, Principal Component Analysis Competitive Learning, Feature Mapping.

Reference Book

- **Recommended List of Readings**
 1. Barton, J.J., Engineering and Scientific C++, An Introduction with advanced techniques and examples, Addison Wesley (1994).
 2. Booch, G., Object Oriented Analysis & Design With Applications, Second Edition, Addison Wesley (1994).
 3. Bookbinder, Drauid, J., Lotus 1-2-3 for Windows at work, Addison Wesley (1992).
 4. Boone, Barry, Java Essentials for C & C++ Programmers, Addison Wesley (1996).
 5. Bergin, Tomas, A., History of Programming Languages, Addison Wesley (1996).
 6. Budd, Timonthy, A., Classic Data Structure in C++, Addison Wesley (1993).
 7. Budd, Timonthy, A., An Introduction to Object Oriented Programming, Second Edition, Addison Wesley (1996).
 8. Buford, John E. Koegal, Multimedia Systems, Addison Wesley (1994)
 9. Burger, Peter, Interactive Computer Graphics, Functional, Procedural And Device Level Methods, Addison Wesley (1989).
 10. Burgess, Mark, S., Advanced Visual Basic, A Developer's Guide, Addison Wesley (1993).
 11. Burgoyne, J., Management Learning, Sage Publications (1998).
 12. Buzzi-Ferraris, G., Scientific C++, Building Numerical Libraries in the object oriented way, Addison Wesley (1993).
 13. Cargill, Tom, C++ Programming Style, Addison Wesley (1992).

14. Capron, Tom, System Analysis and Design, Addison Wesley (1996).
15. Charniak, Eugene, Introduction to Artificial Intelligence, Addison Wesley (1995).
16. Chen, Vincet, Hacker's Guide to Visual Basic, Addison Wesley (1996).
17. Cheswick, William, R., Internet Security, Addison Wesley (1996).
18. Codd, E.M., Relational model for Database Management, Addison Wesley (1990).
19. Collins, William, Data Structures An object oriented Approach, Addison Wesley (1992).
20. Conolly, Thomas, Database Systems A Practical Approach to Design, Implementation And Management, Addison Wesley (1995).
21. Corbit, T., Information technology and its Application, Addison Wesley (1994).
22. Curry, David, Unix System Security, A programmer Guide to Software Development, Addison Wesley (1997).
23. Daniels Caroline, Information Technology, Addison Wesley (1994).
24. Date, C.J., Introduction to Data Base Systems, Addison Wesley (1995).
25. Davis Ralph, Windows Network Programming, How to survive in a 32 Bit Networking World, Addison Wesley (1994).
26. De Blasi, Mario, Computer Architecture, Addison Wesley (1990).
27. Dean, Thomas, Artificial intelligence, Theory & Practice, Addison Wesley (1995).
28. Dettel, Harvey, M., Operating System, Addison Wesley (1990).
29. Elmarsi, Ramex, Fundamental of Data-Base Systems, Addison Wesley (1994).
30. Feuer, Alan, Windows NT, Addison Wesley (1996).
31. Foley, James D., Introduction to Computer Graphics, Addison Wesley (1996).
32. Freeman, James A., Simulating Neural Network with Mathematics, Addison Wesley (1993).
33. Gamma, Erich, Design Patterns, Addison Wesley (1995).
34. Gibbs, Simon, Multimedia Programming, Addison Wesley (1995).
35. Gilb, Tom, Principles of Software Engineering, Addison Wesley (1988).
36. Goodman, M., Making Multimedia work, Comdex Publications (1997).
37. Goscinski, Andrzej, Distributed Operating System, Addison Wesley (1991).
38. Halsall, Fred, Data Communications, Computer Networks And Open Systems, Addison Wesley (1996).
39. Hanly, Jeri, Essentials of C++ for Engineers And Scientists, Addison Wesley (1997).
40. Haviland, Keith, Unix System Programming, Addison Wesley (1997).
41. Humphrey, Watts, S., A Discipline for Software Engineering, Addison Wesley (1995).

42. Heuring, Vincent, Computer Systems Design And Architecture, Addison Wesley (1996).
43. Jain, R.K., Numerical Methods For Engineers, Prentice Hall (1998).
44. Kalawsky, Roy, The Science of Virtual Reality And Virtual Environments, Addison Wesley (1996).
45. Kay, Judy, C Programming in a Unix Environment, Addison Wesley (1988).
46. Khanna, T., Foundations of Neural Network, Addison Wesley (1990).
47. Krezicg, S., Advanced Engineering Mathematics, Prentice Hall (India) (1997).
48. Luger, George, F., Artificial Intelligence, Addison Wesley (1992).
49. Maurer, Stephen, R., Discrete Algorithmic Mathematics, Addison Wesley (1991).
50. Murray, William, Using Visual Basic, Addison Wesley (1992).
51. Murray, S., Schaum Outline on Data Structure, Prentice Hall, (1995).
52. Nolan, Godfrey, World Wide Web Servers for Windows, Addison Wesley (1996).
53. Pao, Yoh-Pan, Adaptive Pattern Recognition and Neural Networks, Addison Wesley (1989).
54. Nutt, Gary, J., Operating Systems, Addison Wesley (1997).
55. Rajaraman, V., Fundamentals of Computers, Prentice Hall (1996).
56. Rolland, E.D., Relational Data-Base Management with Oracle, Addison Wesley (1992).
57. Sallis, Philip, Software engineering, Addison Wesley (1995).
58. Salmon, rod, Computer Graphics, Addison Wesley (1987).
59. Sinha, P.K., Computer Fundamentals, BPB Publications(1990).
60. Silbersschatz, A., Operating System Concepts, Addison Wesley (1997).
61. Tennbaum, A., An Introduction to computer Network, Prentice Hall (1997).
62. Troy, Douglas, Computing Fundamentals, Unix Systems, Addison Wesley (1989).
63. Whitten And Barlow, System Analysis And Design, Galgotia Publication (1995).
64. Wilhelm, Reinhard, Compiler Design, Addison Wesley (1995).
65. Wolfe, Michel, High Performance Compilers for Parallel Computing, Addison Wesley (1996).
66. Wood, Craig, A., Computing Fundamentals, PC DOS And MS DOS, Addison Wesley (1989).
67. Taha A.H., Optimization Technique, Tata Mc-Graw Hill (2001).
68. Swaroop Kanti, Operation Research, BPB Publication (2002).
69. Kruse G. et.al., Internet and Web Programming, Tata Mc- Graw Hill (2000).
70. Tolley, et.al., Principles of Ecommerce, BPB Publication (2000).
71. Aho & Ulman, Principles of Compiler Design, Addison Wesley (2000).

72. Kanetkar, et.al., Programming in Visual C++, BPB Publication (2001).
73. Coreman, Rivest, Lisserson, "Algorithms", Prentice Hall of India (2001).

• **NOTE:**

1. Each Paper Contains Four Units
2. Each Unit Takes Approximately 10 Contact Hours. Hence a Full Paper Takes Approx 40 Contact Hours.

Entrance Exam

Syllabus for Entrance Examination for MCA 2006

- **Unit I - Mathematics**
Solution of Linear and Quadratic Equations, Convergence and Divergence of Series, Functions, Limit and Continuity, Differential and Integral Calculus, Matrix Algebra.
- **Unit II - Computer Fundamentals**
Computer Basics, Data Representations, Binary Arithmetic, I/O Units, Computer Memory, Processor, Logic Circuits, Computer Languages Evolution, Computer Generations and Classifications, Computer Network, Network Topologies.
- **Unit III - Programming in C**
Constants, Variables and Data Types, Operators and Expressions, I/O Operators, Decision Making, Branching, Looping, Arrays, Character Strings, Functions, Unions, Pointers and File Management.

