

**Kadi Sarva Vishwavidhyalaya**

**MCA Syllabus**

[2008 onwards]

**Kadi Sarva Vishwa Vidhyalaya**  
**Regulations for the Degree of Master of Computer Application (M.C.A.)**

**R. PG. MCA 1 :**

Candidates for admission to the 3 - Year Master of Computer Applications (M.C.A.) course must have passed a Bachelor's degree examination either in science or commerce or management or social science or engineering (including technology) or equivalent, at the University examination of any recognized University with a minimum marks decided as per the directives of the qualifying entrance examination or GCET prescribed rules. Under Social Science all Arts graduates except those having graduated with languages as major subjects will be considered eligible for admission.

**R. PG. MCA 2 :**

The admission to the course will be given by merit obtained in a common admission test conducted by this University or appropriate authority.

**R. PG. MCA 3 :**

Examination for the M.C.A. course will be conducted under the Semester system. For this purpose, each academic year will be divided into two Semesters.

**R. PG. MCA 4 :**

A candidate who has passed an equivalent examination from any other University or examining body and is seeking admission to the MCA course shall not be admitted without producing the Eligibility Certificate and the Migration certificate.

**R. PG. MCA 5 :**

No candidate will be admitted to any Semester examination for Master of Computer Applications unless it is certified by the Designated Authority which is the Head of the University Department or Principal of an affiliated college of the University :

- ( 1 ) That he has attended the course of study to the satisfaction of the designated authority.
- ( 2 ) That he has maintained a good conduct and character during the studies.

**R. PG. MCA 6 :**

Candidates desirous of appearing at any Semester examination of the M.C.A. course must forward their applications in the prescribed form, through the designated authority on or before the prescribed date.

**R. PG. MCA 7 :**

For any Semester the maximum marks for the internal and external assessments shall be shown in the teaching and examination scheme. For the purpose of internal assessment, sessional tests or any other suitable methods of assessment may be used by a department. The department will submit the internal as well as the midterm examination marks as per the notification of the University.

**R. PG. MCA 8 :**

A candidate will be promoted to the subsequent Semester according to the following scheme:

- (a) A candidate would be granted admission to the Second Semester irrespective of the result of First Semester.
- (b) A candidate would be granted admission to the Third Semester if and only if he/she has cleared all the subjects of First Semester and irrespective of the result of Second Semester.
- (c) A candidate would be granted admission to the Fourth Semester if and only if he/she has cleared all the subjects of Second Semester.

- (d) A candidate would be granted admission to the Fifth Semester if and only if he/she has cleared all the subjects of Third Semester.
- (e) A candidate would be granted admission to the Sixth Semester if and only if he/she has cleared all the subjects of Fourth Semester.
- (f) The final degree would be awarded to the student on successful completion of Semester VI.

**R. PG. MCA 9 :**

Following criteria would be followed for awarding the mark statement of any Semester in MCA:

- (a) The mark statement with passing certificate for any Semester would be issued only if the student has cleared all the subjects in that Semester.
- (b) The mark statement with cancelled certificate for any Semester would be issued if the student has not cleared one or more subjects in that Semester.
- (c) In case a student is unable to clear all the subjects in any Semester, he/she would be reappearing for the same in the ATKT examinations. The mark statement with passing certificate will be issued only after all ATKTs' in that Semester are cleared. The ATKT marksheet would also have the marks of previously passed subjects carried forward in the marksheet.

**R. PG. MCA 10 :**

(a) To pass a subject in any Semester a candidate must obtain a minimum of 40% of marks under each head of the subject and minimum of 45% in the aggregate of that subject.

(b) If a candidate fails in only aggregate, but passes under each head, he/she has to appear for the end-term theory examination of that subject.

(c) If a candidate passes in aggregate, but fails in any other heads of a subject, he has to appear for that particular head to pass. (That is, for example if candidate passes in aggregate but fails in midterm exam of a subject, he has to reappear for midterm of that subject.)

(d) If a student fails in aggregate and also in any of other heads, he has to reappear for that particular head and pass in both. (That is, for example, if a candidate fails in aggregate and also fails in midterm exam of a subject, he has to reappear for the midterm examination of that subject and see that he/she passes in midterm as well as his/her aggregate should reach to 45%.)

**R. PG. MCA 11 :**

(a) For award of class at the end of Semester VI, the aggregate marks will consist of the sum of the following:

<b>YEAR</b>	<b>TOTAL Marks</b>	<b>Weightage</b>
<b>First Year Subjects</b> (First Semester + Second Semester)	1500	15%
<b>Second Year Subjects</b> (Third Semester + Fourth Semester)	1500	35%
<b>Third Year Subjects</b> (Fifth Semester + Sixth Semester)	2000	50%
<b>TOTAL</b>	5000	100%

(b) Using the aggregate marks calculated as per the above scheme a class will be awarded as follow:

- |                       |                                |
|-----------------------|--------------------------------|
| (1) 70% or more marks | - First Class with Distinction |
| (2) 60% or more marks | - First Class                  |
| (3) 50% or more marks | - Second Class                 |

**COURSE FOR THE THREE YEAR FULL-TIME MCA PROGRAMME  
(SEMESTER - WISE)**

**Name of the Course** : **Fundamentals of Programming**  
**MCA Semester-I** : **MC01**

**Course Objective** :

- Basic concepts of C Programming language
- Basic techniques to solve a problem.
- Implement the solution of problem with the help of C – Programming Language.

**Course Content** :

**Unit-1** (20%)

Introductory Concepts: Introduction to computer, Types of Programming Languages, Flowcharts, Algorithms, An overview of C - Data types and sizes-declarations- variables, Constants- Operators- Expressions

**Unit-2** (20%)

Program control structures( If, if-else, else-if ladder), Loop control structures(while, for, do-while, break, continue), C formatted Input/Output, Arrays-Introduction-One Dimensional –Two Dimensional –Multidimensional arrays, Strings - Declaring and Initializing string variables- Reading from the terminal and Writing to the screen- Operations on String- String Handling Functions.

**Unit-3** (20%)

Function - Function Arguments - Function prototype - Recursion, Structures and Union- Structure Initialization-Comparison of Structure Variables-Array of Structure-Array within Structures- Structures within Structures-Structure and Function-Union.

**Unit-4** (20%)

Pointers-Fundamentals, Passing Pointer to Function, Pointer and Arrays, Dynamic memory allocation, Operations on Pointers, Pointer and Structures

**Unit-5** (20%)

File Management – Defining and Opening File, Closing a File, Operation on File, C processor, Command Line Arguments, Hardware Interaction

**Text Book** :

Programming in ANSI C by E.Balagurusamy, Tata McGraw Hill

**Reference Books:**

Programming in C by Pradip Dey and Manas Ghosh, Oxford University Press

Programming with C by Byron Gottfried, Schaums Outline,Tata McGraw Hill

Let Us C by Yaswant Kanetkar, BPB Publication

**Name of the Course : Fundamentals of Computer Organization**  
**MCA Semester I : MC02**

**Course Objective :**

The purpose of this course is to give students an understanding of computer organization: the internal structure and operation of a digital computer at the level of memory, registers and flow of control.

**Course Content:**

**Unit I (20%)**

Number Systems: Binary, Decimal, Octal, Hexadecimal, Binary Addition, Subtraction, Multiplication, Division, Negative Numbers, Use of Complements to represent negative numbers. Boolean algebra and Logic Gates: Fundamental Concepts of Boolean Algebra, Logical Addition and Multiplication, Gates, Evaluation of Logical Expressions, Basic Laws of Boolean Algebra, Simplifications of Expressions, De-Morgan's theorem, Derivation of Boolean Expression, Interconnecting Gates, Sum of Products and Product of Sums, Map method for simplifying expressions.

**Unit 2 (20%)**

Logic Design: Flip-Flops, Transfer Circuits, Flip-Flop Designs, Triggering of Flip-Flops, Clocks, Registers, Shift Registers, Binary Counters.

**Unit 3 (20%)**

Arithmetic Logic Unit: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Parallel Binary Adder, Binary Coded Decimal Adder, Decoder, Encoder, Multiplexer, Design of Accumulator, Design of Arithmetic & Logic Unit.

**Unit 4 (20%)**

Memory Unit: Classification of Memory, Memory Hierarchy, Static RAM, Dynamic RAM, ROM logic, Instruction Prefetch, Memory Interleaving, Write Buffer, Cache Memory, Virtual Memory.

**Unit 5 (20%)**

Processor Design and Control Unit: Processor Design Process, Datapath Organization, Interrupt Recognition and Service, Instruction Cycle and Execute Cycle.  
Computer Organization: Addressing Techniques

**Text Book:**

**Compiled Book.**

**Reference Books:**

1. Digital Logic & Computer Design By – Morris Mano
2. Digital Computer Fundamentals (Sixth Edition) - Thomas Bartee , McGrawHill
3. IBM PC and Clones By - B. Govindrajalu

**Name of the Course** :Database Management System – I  
**MCA Semester-I** :MC03

**Course Objective** :

The course envisages to introduce to the students the basic operations of the database and expose them to the use of access as an important tool and the concepts like data analysis and what-if analysis. Fundamentals of Database, Queries, Reports and Macros using MS Access also form an important constituent of the course objectives.

**Course Content** :

**Unit – 1- Data Environment** (25%)

Definition of data, issues in managing data. Uses and needs of data in the organization. Defining data needs. Trade-offs between utilization of data and control of data. Defining tables and queries using MS Access. Defining structures and queries using oracle.

**Unit – 2- Basic Technical Concepts and System Resources for Data** (25%)

(a) Introduction : The notion of a data structure, primitive and composite data types, basic machine architecture, character codes.

(b) Data Structures : Definition, logical structure, physical implementation, applications and operations for strings, arrays, stacks, queues, linked lists, trees and graphs. Searching and sorting techniques. Data handling facilities of higher level languages.

**Unit – 3 Database Concepts** (25%)

(a) Database management systems: Introduction and history, hierarchical and relational systems. Role of databases in information systems, goals and objectives of integrated databases. Database design philosophies. Logical and physical database design conceptual data models. Query interfaces.

(b) Logical data models: data abstraction, entity-relationship model, relational database, normalization, data dictionaries and directories.

**Unit – 4 Use and management of data bases** (25%)

Database management system facilities in building information system application. Use of high-level, user-oriented data language facilities for query, Update and report generation.

**Course Book:**

1. Database Management System by Korth
2. Understanding SQL by Martin Gruber, BPB Publication

**Reference Books :**

1. Database Management System by C. J. Date
2. Mastering SQL by Martin Gruber, BPB Publication
3. SQL and PL/SQL Programming by Evan Bayross

**Name of the Course** :Discrete Mathematics  
**MCA Semester-I** :MC04

**Course Objective** :

- To relate the fundamentals of discrete mathematics and its applications to various areas of computer studies.
- To develop mathematical reasoning and analytical thinking which is the base of computer science.

**Course Content** :

**Unit 1:** Set Theory & Mathematical Logic: (20%)

Representation of Sets, Types of Sets, Operations of Sets, Inclusion and Exclusion principles, Types of Relations, Matrix representation of relations, Connectives, Statements, Negation, Conjunction, Disjunction, Conditional, Biconditional, wff, Two-state Devices, Conjunctive Normal form, Disjunctive Normal form, PDNF, PCNF, .Introduction to Predicate Calculus.

**Unit 2:** Posets & Lattices: (20%)

Partial order relation, examples of posets, Hasse diagram representation of posets, least, greatest elements, lower bounds, g.l.b, upper bounds, l.u.b in a poset, Definition of lattice, examples and representation of lattices, properties of lattices

**Unit 3:** Boolean Algebra & its Applications: (20%)

Definition, examples and representation of B.A., Boolean equivalences, Homomorphism and isomorphism, Stone's Representation theorem, Minterms and Maxterms, Free Boolean algebra, Values of Boolean expressions, canonical forms, Minimization of Boolean Expressions, Karnaugh maps.

**Unit 4:** Group Theory & Graph theory: (20%)

Definitions and examples of semigroups, monoids and groups, abelian group, cyclic groups, subgroups, permutation groups, Application of Group theory, Introduction to Graph theory, Types of Graphs, Paths, circuits, Shortest Path algorithm.

**Unit 5:** Finite State Machines & Fuzzy Sets: (20%)

FSM without output, FSM with output, finite state automata, Language recognition, Related Definitions of Fuzzy sets, basic operations on fuzzy sets, Fuzzy relations.

Text Books:

1. "Discrete Mathematical Structures with applications to Computer Science" - J.P.Tremblay, R. Manohar, (Tata McGrawHill Publications)

Reference Books:

1. "Discrete Methods & Its Applications" - Kenneth H. Rosen (Tata McGrawHill Publications)
2. "Discrete Mathematics" – Vinay Kumar (BPB Publications)
3. "Discrete Mathematics" – S. Nanda (Allied Publications)

**Name of the Course : Internet Technologies**  
**MCA Semester-I :MC05**

**Course Objective :**

The primary objective is to impart knowledge about Internet and there applications. This course also teaches the students to develop static web page using HTML and to develop a project using HTML

**Course Content:**

**Unit – 1: (20%)**

What is Internet – The Wired World of Internet - How Information Travels across – How TCP/IP works – Understanding Internet address and Domains- How the Domain name system works? – How the Routers work - Connecting to the Internet: connecting your computer to Internet – How ISDN Works – How the Network Computers work – How DSL works - Communicating on the Internet: Working of E-mails – Email spam and Blocking – Internet chat and instant messaging – Making phone calls on the Internet

**Unit – 2: (20%)**

Common Internet Tools: Gophers – Telnet – FTP and Downloading Files – Web browsers – Markup language – web host servers – websites work with databases – Audio/Video on the Internet – Working of the Intranet – Firewalls – Cookies – Cryptography and Privacy – Digital certification .

**Unit – 3: (20%)**

HTML: Requirements for using Html -Html Elements – Body Elements – Character Elements – Adding Image to Web page – Creating the image map – List Elements Figure Elements

**Unit -4: (20%)**

Table Elements – Form elements – Netscape Extensions – Creating Image Map – Common Gateway Interface – Creating Frames and Cookies – Cascading Style Sheets

**Unit -5: (20%)**

Overview of MS-Word – Overview of MS-Excel – Overview of MS-Power point

**Text Book**

1. How the Internet Works – Preston Gralla , Techmedia , fourth edition
2. The HTML Example Book – Edward Farrar & Norman E. Smith – BPB Publications
3. Microsoft Office97 – Will Train – BPB Publication

**Reference Books**

1. The Internet in a Nutshell – Valerie Quercia, Shroff Publishers & Distributors
2. Practical HTML - Lee Anne Phillips, Prentice Hall of India

**Name of the Course** :Communication Skills  
**MCA Semester-I** :MC-06

**Course Objective** :

- To use the communication basics for effective communication.
- Ability to use technology for communication.
- Ability to analyze and plan for a Business Writing Task.
- To be more creative and active by learning to design effective advertisements.

**Course Content** :

Unit 1	Introduction to Communication Verbal and Non- Verbal Communication ,Miscommunication, Effectiveness in Managerial Communication, Strategies for Improving Organizational Communication	(20%)
Unit 2	Language Skills for Effective Communication: Verbs and Subjects, Tenses, Use of Preposition and Conjunctions. Punctuation and Capitalization	(20%)
Unit 3	Technology Enabled Communication: Technology based Communication Tools, Positive and Negative Impact of Technology-enabled Communication, Selection of appropriate Communication Technology, Tips for Effectiveness in Technology based Communication.	(20%)
Unit 4	Written Communication I: Letter Writing, Memorandums, Notices, Press Release.	(20%)
Unit 5	Written Communication II: Advertisements, Business Proposals and Reports	(20%)

**Text Book:**

1. Raman, Meenakshi, Singh Prakash. *Business Communication*. India, Oxford University Press, 2006.

**Reference Books:**

1. Chaturvedi, P.D., Chaturvedi, Mukesh. *Business Communication : Concepts, Cases and Applications*. Pearson Education, 2004.
2. Murphy, Hildebrandt, Thomas. *Effective Business Communication*. Mc. Graw Hill, 1997.
3. Lesikar, V. Raymond, Pettit. D. John. *Business Communication: Theory and Application*. Delhi: Irwin: 1996.

**Name of the Course** : **Operating System**  
**MCA Semester II** : **MC07**

**Course Objective** :

This subject provides a basic introduction to computer operating systems. The operating system provides the necessary facilities to allow the application programs to access the computer.

**Course Content:**

**Unit I** (20%)

Introduction to Operating System: History of Operating Systems, Operating System Concepts, System Calls, Operating System Structure.

Processes and Threads: Processes, Threads, InterProcess Communication.

**Unit 2** (20%)

Memory Management: A Memory Abstraction, Virtual Memory, Page Replacement Algorithms, Design Issues for Paging Systems, Implementation Issues, Segmentation.

**Unit 3** (20%)

File Systems: Files, Directories, File System Implementation, File System Management & Optimization.

Input/Output: Principles of I/O Hardware, Principles of I/O Software, I/O Software Layers, Disks, Clocks, User Interfaces, Thin Clients, Power Management.

**Unit 4** (20%)

Deadlocks: Introduction to Deadlocks, Resources, Deadlock Avoidance, Deadlock Prevention, Other Issues.

Multiple Processor Systems: Multiprocessors, MultiComputers, Virtualization, Distributed Systems

**Unit 5** (20%)

Security: The Environment, Basics of Cryptography, Protection Mechanisms, Authentication, Insider Attacks, Exploiting Code Bugs, Malware, Defenses.

Case Studies: Linux, Windows Vista, Symbian OS

**Text Books:**

1. "Modern Operating Systems", by Andrew S.Tannenbaum, PHI, 3<sup>rd</sup> Edition

**Reference Books:**

1. "Operating System Concepts", William Stallings, Pearson, 5th Ed
2. "Operating Systems", Madnick E., Donovan J., Tata McGraw Hill, 2001

**Name of the Course : Data and File Structures**  
**MCA Semester II : MC08**

**Course Objective :**

The purpose of this course is to provide the students with solid foundations in the basic concepts of programming: data structures and algorithms.

**Course Content:**

**Unit 1. Data Structures (20%)**

Introduction – Arrays – Structures – Stack: Definition and examples, Representing Stacks – Queues - Linked Lists – Representation – Operations – Single Linked list – Double linked list – circular linked list - Applications of Stack, Queue and Linked Lists.

**Unit 2. Trees (20%)**

General trees - Binary Trees – Binary Tree Representations – traversing binary trees – Binary search tree – AVL trees - node representation: Inserting nodes – deleting nodes

**Unit 3. Sorting and Searching (20%)**

Binary search – Introduction to sorting: A Selection sort – An Insertion sort – An Exchange sort: The Bubble Sort – Merge sort – The Partition Exchange sort (Quick sort) – The Heap sort

**Unit 4. Graphs and Hashing (20%)**

Definition – Representations of graph – Graph Traversal – An application of graphs – Shortest path algorithm - Dijkstra's algorithm – An application of scheduling – Critical Paths – Spanning Trees – Kruskal's Algorithm Hashing: Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing

**Unit 5. File Systems (20%)**

Files – File organization – File operations – Sequential file organization: Definition – Storing Sequential Files – Declaring Sequential Files – Creating, retrieving, updating sequential file – Relative File Organization: Definition – Addressing technique – direct Mapping Technique – Directory Lookup technique Indexed Sequential File Organization: Definition – Applications – Examples – Physical layout Indexes

**RECOMMENDED TEXTS:**

1. Data Management and File Structure by Mary E. S. Loomis using Prentice Hall of India
2. Weiss "Data Structures and Algorithm Analysis in C", Addison Wesley, Second Edition using Pearson Education Asia.

**REFERENCES**

1. Robert Kruse & Clovis L. Tondo "Data Structures and Program Design in C", Prentice Hall, 2nd edition. 1991.
2. Classic Data Structure – D. Samanta in Prentice Hall of India



**Name of the Course** :Database Management System – II  
**MCA Semester-II** :MC10

**Course Objective** :

The objective is to develop and manage data resource. In order to achieve this, the course provides technical background on computer system management of data. Within the context of the technical background, the course provides instruction in defining data needs, functions on data, user oriented data languages, and management of data within organizations, Understanding of data structure and storage, Data-base management functions and data-base management systems, User oriented data languages.

**Course Content** :

**Unit – 1-** Data Entry Form Design

Designing & usage of forms in Oracle.

**Unit - 2-** Triggers, Rules, Procedures, Stored Procedures,  
Data Base Procedures

Creation of triggers; usage of triggers; Creation of stored procedures; use of stored procedures, functions, packages, cursor variables, objects, nested tables, Varrays, built in packages

**Unit – 3–** Menus

Using of menus in Oracle.

**Unit – 4 -** SQL & 4GL of RDBMS

Use of SQL queries in procedures & functions. Understanding of 4GL of RDBMS.

**Unit – 5 -** Utilities for DBA,Data base administration

Functions of DBA, Importance of DBA, Authority given to DBA.  
DBMS evaluation, selection, standardization, survey of commercial DBMS, implementation tools.

**Text Books:**

1. Oracle 9i PL/SQL Programming - Oracle Press

**Reference Books:**

1. PL/SQL Programming Shroff Publication
2. SQL , PL /SQL Programming - Ivan Bayross
3. PL/SQL in 21 days
4. Oracle 8i DBA Bible
5. Oracle 8i Complete Reference

**Name of the Course** : **System Analysis and Design**  
**MCA Semester-II** : **MC11**

**Course Objective** :

- To know about different System Development Methodologies.
- Basic concepts of system designing and analyzing.

**Course Content** :

**Unit-1:** Introduction to Information Systems.

- Introduction & need for SAD.
- Concept of System, Characteristics, Types & Control Elements of System.
- Information Systems & its categories, Types of Users.
- System Analysis, Responsibilities & Attributes required in System Analyst
- Sources for Project Proposals, Reasons for Project Proposals, 5 C's.
- Managing Project Review & Selection.

**Unit-2:** System Development.

- System Development Strategies (SDLC, System Prototyping & SSADM).
- Cost Benefit Analysis.
- Fact Finding Techniques with pros & cons.
- Tools for Documenting Procedures & Actions

**Unit-3:** System Design.

- Objectives in designing an Information System.
- Structured Analysis & Tools of Data Flow Strategy.
- Normalization.
- Computer Aided System Tools.
- Design of Computer Output.
- Design of Input & Control, Design of Files.

**Unit-4:** System Engineering & Quality Assurance.

- Testing
- Design Objectives & Design of Software.
- Software Design & Documentation Tools.
- Audit Trial & Certification.
- Documentation Standards.

**Unit-5:** System Implementation.

- Pre-Implementation safeguards.
- User Training.
- Conversion Methods & Post Implementation Review.
- Hardware & Software Selection.
- Proposals & Contracts, Maintenance of System

**TEXT BOOK:**

Analysis & Design of Information Systems by James .A. Senn

**REFERENCE BOOKS:**

1. System Analysis & Design by Elias M. Awad
2. Workbook on System Analysis & Design by V.K Garg.

### 3. System Analysis & Design by Kendall & Kendall

**Name of the Course** : **Computer Oriented Numerical Methods**  
**MCA Semester-II** : **MC12**

**Course Objective** :

- To solve linear and non linear algebraic equations, perform operations of calculus, fit curves and solve differential equations, also using a computer.
- To appreciate problems due to rounding errors and convergence.

**Course Content** :

**Unit 1:** Computer Arithmetic & Iterative Methods:

Floating Point representation of numbers, Normalized floating point numbers, Errors in numbers, Beginning and termination of an iterative method, Solution of Linear and transcendental equations, Bisection, False Position, Secant, Successive Approximation, Newton Raphson methods.

**Unit 2:** Interpolation and Approximation:

Lagrange's interpolation, Forward difference, Backward difference, Divided difference interpolation, Inverse interpolation, Interpolation for unequally spaced points, Taylor's Series expansion, Linear Regression and Non-Linear Regression (Least square Curve fitting)

**Unit 3:** Solution of Simultaneous Equations & Ordinary Differential Equations:

Gauss Elimination method & Gauss Jordan method, pivoting, illconditioned equations, Jacobi and Gauss Seidal methods, comparison of direct and iterative methods, Euler's Method, Runge-Kutta method second and fourth order methods, Predictor – Corrector methods.

**Unit 4:** Numerical Differentiation and Numerical Integration:

Numerical Differentiation using Newton's forward and backward difference formulae, Concept of Numerical Integration, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rules, Gauss Quadrature formula.

**Text Books:**

1. "Computer Oriented Numerical Methods" – V. Rajaraman (PHI publications)
2. "Numerical Methods" – E. Balaguruswamy (TMH publications)

**Reference Books:**

1. "Computer Oriented Numerical Methods" – C. K. Kumbharana & Dr N. N. Jani
2. "Numerical Methods – Problems and Solutions" – M. K. Jain and R. K. Jain
3. "Numerical methods" – Dr VN vedamurty & Dr Lyengar
4. "Introductory Methods of Numerical Analysis" - S. S. Sastry (PHI publications)
5. "Exploring and using MATLAB" - Dr N..N Jani