

Scheme & Syllabus of Master in Computer Application

Examination Schemes for MCA

Master in Computer Application (First Year SEM-I)

1ST YEAR SEMESTER 1	Teaching Scheme per week (hrs.)		Total	Duration of Paper /Pract (Hrs)	Examination Scheme			
	L/T	P			External Marks	Internal Marks	Total Marks	Minimum Passing
1CSA-1 Computer Organization and Architecture	4	-	4	3	80	20	100	40
1CSA-2 Object Oriented Programming using C++	4	-	4	3	80	20	100	40
1CSA-3 Operating System	4	-	4	3	80	20	100	40
1CSA-4 Digital Electronics and Microprocessor	4	-	4	3	80	20	100	40
1CSA-5 System Analysis and Design	4	-	4	3	80	20	100	40
1CSA-6 Practical-I (Based on 2)	-	7	7	3	50	50	100	50
1CSA-7 Practical-II (Based on 4)	-	7	7	3	50	50	100	50
TOTAL	20	14	34	--	700			

1ST YEAR: SEMESTER 1

- 1CSA-1** Computer Organization and Architecture
- 1CSA-2** Object Oriented Programming using C++
- 1CSA-3** Operating System
- 1CSA-4** Digital Electronics and Microprocessor
- 1CSA-5** System Analysis and Design
- 1CSA-6** Practical-I (Based on C++)
- 1CSA-7** Practical-II (Based on Microprocessor)

Master in Computer Application (First Year Sem-II)

1ST YEAR SEMESTER 1	Teaching Scheme per week (hrs.)		Total	Duration of Paper /Pract (Hrs)	Examination Scheme			
	L/T	P			External Marks	Internal Marks	Total Marks	Minimum Passing
2CSA-1 Data Structures	4	-	4	3	80	20	100	40
2CSA-2 Database Management Systems	4	-	4	3	80	20	100	40
2CSA-3 Discrete Mathematics and Graph Theory	4	-	4	3	80	20	100	40
2CSA-4 Java Programming	4	-	4	3	80	20	100	40
2CSA-5 Statistical and Numerical Mathematics	4	-	4	3	80	20	100	40
2CSA-6 Practical-I (Based on Java)	-	6	6	3	50	50	100	50
2CSA-7 Practical-II (Based on Data structures and Statistics and Numerical Mathematics)	-	6	6	3	50	50	100	50
2CSA-8 Project-I & Seminar (Using C++ or Java and Application area related to one of the subject studied till now.)	-	3	3	30 Minutes	30+20	30+20	100	50
TOTAL	20	15	35	--	800			

1ST YEAR SEMESTER 2

2CSA-1 Database Structures

2CSA-2 Database Management Systems

2CSA-3 Discrete Mathematics and Graph theory

2CSA-4 Java Programming

2CSA-5 Statistics and Numerical Mathematics

2CSA-6 Practical-I (Based on Java)

2CSA-7 Practical-II (Based on Data structures and Statistics and Numerical Mathematics using C++)

2CSA-8 Project I & Seminar (Using C++ or Java and application area related to one of the subject studied till now.)

Master in Computer Application (Second Year Sem-I)

1ST YEAR SEMESTER 1	Teaching Scheme per week (hrs.)		Total	Duration of Paper /Pract (Hrs)	Examination Scheme			
	L/T	P			External Marks	Internal Marks	Total Marks	Minimum Passing
3CSA-1 E-Commerce	4	-	4	3	80	20	100	40
3CSA-2 Data Communication & Network.	4	-	4	3	80	20	100	40
3CSA-3 Design and Analysis of Algorithm.	4	-	4	3	80	20	100	40
3CSA-4 Operation Research	4	-	4	3	80	20	100	40
3CSA-5 Database Administration	4	-	4	3	80	20	100	40
3CSA-6 Practical-I (Based on Oracle)	-	7	7	3	50	50	100	50
3CSA-7 Practical-II (Based on Operation Research using C++)	-	7	7	3	50	50	100	50
TOTAL	20	14	34	--	700			

2nd YEAR SEMESTER-1

3CSA-1 E-Commerce

3CSA-2 Data communication & networks

3CSA-3 Design and analysis for algorithm

3CSA-4 Operation Research

3CSA-5 Database administration

3CSA-6 Practical-I (Based on Oracle)

3CSA-7 Practical-II (Based on Operation Research using C++)

Master in Computer Application (Second Year Sem-II)

1ST YEAR SEMESTER 1	Teaching Scheme per week (hrs.)		Total	Duration of Paper /Pract (Hrs)	Examination Scheme			
	L/T	P			External Marks	Internal Marks	Total Marks	Minimum Passing
4CSA-1 Computer Hardware Interfacing	4	-	4	3	80	20	100	40
4CSA-2 Distributed Database Management Systems	4	-	4	3	80	20	100	40
4CSA-3 Computer Graphics	4	-	4	3	80	20	100	40
4CSA-4 Distributed Operating Systems	4	-	4	3	80	20	100	40
4CSA-5 C# and Dot Net.	4	-	4	3	80	20	100	40
4CSA-6 Practical-I (Based on C# and Dot Net)	-	6	6	3	50	50	100	50
4CSA-7 Practical-II (Based on Computer Graphics C++)	-	6	6	3	50	50	100	50
4CSA-8 Project-I & Seminar (Using C++, C# or Java and Application area related to one of the subject studied till now.)	-	3	3	30 Minutes	30+20	30+20	100	50
TOTAL	20	15	35	--	800			

2nd YEAR SEMESTER-2

4CSA-1 Computer Hardware Interfacing

4CSA-2 Distributed Database Management System

4CSA-3 Computer Graphics

4CSA-4 Distributed Operating System

4CSA-5 C# & Dot Net.

4CSA-6 Practical-I (Based on C# & Dot Net.)

4CSA-7 Practical-II (Based on Computer Graphics & C++)

4CSA-8 Project II (Using C++, C# or Java and Application area related to one of the subject studied till now.)

Master in Computer Application (Third Year Sem-I)

1ST YEAR SEMESTER 1	Teaching Scheme per week (hrs.)		Total	Duration of Paper /Pract (Hrs)	Examination Scheme			
	L/T	P			External Marks	Internal Marks	Total Marks	Minimum Passing
5CSA-1 Data Warehousing and mining	4	-	4	3	80	20	100	40
5CSA-2 Embedded Systems	4	-	4	3	80	20	100	40
5CSA-3 Network Security	4	-	4	3	80	20	100	40
5CSA-4 Elective-I	4	-	4	3	80	20	100	40
5CSA-5 Elective-II	4	-	4	3	80	20	100	40
5CSA-6 Practical-I (Based on Embedded Systems, Network Security & Data warehousing &Data Mining)	-	7	7	3	50	50	100	50
5CSA-7 Practical-II (Based on Elective-I or Elective-II)	-	7	7	3	50	50	100	50
TOTAL	20	14	34	--	700			

3rd YEAR SEMESTER-1

5CSA-1 Data Warehousing & Data mining

5CSA-2 Embedded Systems

5CSA-3 Network Security

5CSA-4 Elective-I (a) Legal Aspect of IT
(b) Software Engineering

5CSA-5 Elective-II (d) VB.NET
(e) ASP.NET

5CSA-6 Practical-I (Based on Embedded System, Network Security & Data warehousing &Data Mining)

5CSA-7 Practical-II (Based on Elective-I or Elective-II)

Master in Computer Application (Third Year Sem-II)

3rd YEAR SEMESTER-2	Duration of Paper/Practical (hrs)	Examination Scheme			
		External Marks	Internal Marks	Total Marks	Minimum Passing
6CSA-1 Project Work- Full Time	3	250	200	450	270
Project Seminar	1	150	100	250	150
6CSA-2 Seminar 4 Nos.	30 Minutes (Each)	---	100	100	60
Total				800	

MCA, Semester-I
1CSA-1: Computer Organization and Architecture

Principles of Computer Design:

Software, hardware interaction, layers in computer architecture, Central processing and machine language instructions, addressing modes, instruction types, instruction set selection, Instruction and execution cycle.

Control Unit:

Data path and control path design, Microprogramming v/s hardwired control, Pipelining in CPU design, RISC v/s CISC, Superscalar processors.

Memory Subsystems:

Storage technologies, memory array organization, memory hierarchy, interleaving, cache memory and virtual memory including architectural aids to implement these.

Input-Output Processing:

Bus interface, data transfer techniques, I/O interrupts and channels.

Performance Evaluation:

SPEC marks, Transaction Processing Benchmarks.

References:-

1. Computer Architecture and Organization by Tanenbaum
2. Computer Architecture and Organization by J. P. Hayes
3. Parallel Processing By Hwang

MCA, Semester-1

1CSA-2: Object Oriented Programming using C++

Unit-I : Programming Logic

Problem Analysis, Process Analysis, Conceptual development of solution.

Development tools: Algorithm, flowcharts and pseudocode (Definition and its Characteristics).

Programming structure: Sequence, Selection, Iteration, (Problems). **Language evolution:** Machine, Assembly, High Level. **Translators:** Compiler, Interpreter and Assembler. The Compilation process, Linker, Loader. Study of HLL, Characteristics of Good Language, Generation of languages.

Unit 2: Object Oriented Concepts .Tokens, Expressions and Control Structures

Object Oriented Methodology, Basic concepts/characteristics of OOP. Advantages and Application of OOPS, Procedural Programming Vs OOP. **Introduction:** C++ Basics, Character Set, Tokens, Keywords, Identifiers; Basic, User Defined and Derived Data Types, Symbolic Constants, Variables, Casting, Different Types of Operators their Precedence, Expressions. **Control Structures with special emphasis on problem solving:** Control and Looping Statements, Console I/O Operations, manipulators and enumeration.

Unit 3:- Functions. Structure, Classes and Object

Function: Function Prototyping, Call and Return by Reference, Inline Function, Default and const arguments, function overloading. Structure, Union and enum: Definition, Passing Structure to functions. **Classes and Objects:** Specifying a Class, Creating Objects, Private & Public Data members and member functions. Defining Inline Member Functions, Static Data Members and Member functions. Arrays within Class, Arrays of Objects, Objects as Function arguments, Returning Objects.

Unit4:-Constructors and Destructors, Operators overloading and Inheritance.

Constructors and Destructors: Introduction, Parameterized constructors, Multiple Constructors in a class, Constructors with Default Arguments, Dynamic Initialization of Objects, copy constructor, Dynamic constructors, const objects, Destructors. **Operator Overloading:** Definition, Unary and Binary Overloading, Rules for Operators Overloading. **Inheritance:** Defining Derived Classes, Single, Multilevel, Multiple Inheritance, Constructors and Destructors in derived classes.

Unit 5:- Pointers Virtual & Friend functions and file handling

Pointer to objects, this pointer, 'new' and 'delete' operators, Virtual functions, friend functions. Opening, Closing a File, File Modes, File Pointers and their Manipulations, Sequential Input and Output Operations, Updating a File. Random access, Error Handling during file operations, Command line Arguments.

BOOKS:

1. Object Oriented Programming with C++ by E Balgurusamy [Tata McGraw Hill Publishing Company Limited, New Delhi]
2. Object orientation through C++ by Parimala N. [Macmillan India Ltd., Publication]
3. C + + Programming - for absolute beginner by Henkemans Lee [PHI].
4. Information technology concepts by Dr. Madhulika Jain, Shashank & Satish Jain [bpb Publication, New Delhi]

MCA. Semester-I

1CSA-3 : Operating System

Unit – 1: Introduction

Operating system as an extended machine, Operating system as an Resource Manager, History of Operating Systems & Its generations, Mainframe operating system, Server operating system, Multiprocessor operating system, Personal Computer operating system, Real Time operating system, Embedded operating system, Smart Card operating system, Processor, Memory, I/O devices, Buses, Processes, Deadlocks, Memory Management, Input/output, Files, Security, The Shell, Systems Calls, Operating System Structure.

Unit - 2: Processes & Threads

Process Model, Process Creation, Process Termination, Process Hierarchies, Process state, Implementation of Processes, Thread Model, Thread usage, Implementing threads in user space & Kernel, Hybrid Implementation, Scheduler Activations, Pop-Up Threads, Interprocess Communication, Scheduling.

Unit – 3: File System Concepts in Operating System

File naming, File structure, File types, File Access, File attributes, File operations, Memory mapped files, Single level Directory system, Two level Directory system, Hierarchical Directory system, Path

name, Directory Operations, File system layout, Implementing Files, Implementing Directories, Shared files, CD-ROM File System, MS-DOS File System, Windows 98 File System, Unix File System.

Unit - 4: Unix Operating System

History of UNIX File System: PDP-11 UNIX, Portable UNIX, Berkeley UNIX, Standard Unix, Linux. Overview of UNIX: UNIX Goals, Interface to UNIX, The Unix shell, Unix Utility program, Kernel structure. Processes in UNIX: Process Management System Calls, Implementation of processes in UNIX, Booting Unix, Memory Management in Unix, Input Output in Unix, The Unix File System, Security in Unix.

Unit - 5: Windows 2000 Operating System:

History of Windows 2000, Programming Windows 2000, System Structure, Processes and threads in Windows 2000, Memory Management in Windows 2000, Input Output in Windows 2000, The Windows 2000 File system, Security in Windows 2000.

Books

1. Modern Operating Systems by Andrew Tanenbaum, PHI Publication. (Chap. 1,2,6,10,11)
2. Unix the Complete Book A Guide for the professional by Jason Manger, Galgotia Publication.
3. Red Hat Linux 7 by Brain Proffitt, PHI Publication.

MCA. Semester-I

1CSA-4 : Digital Electronics and Microprocessor

Unit - 1: Number System and Data Representation

Number System: Binary, Octal, Decimal and Hexadecimal number system and their inter-conversion. **Binary Codes:** BCD, Excess 3, Parity, Gray, ASCII and EBCDIC codes, their advantages and disadvantages. **Data Representation:** Positive, negative, maximum and minimum number representation (related to 8 bit number), real number representation, underflow, overflow, range and accuracy of numbers.

Unit - 2 : Binary Arithmetic

Binary addition, decimal subtraction using 9's and 10's compliment, binary subtraction using 1's and 2's compliment, multiplication and division. **Logic gates:** Truth table, properties and symbolic representation of NOT, AND, OR, NOR, NAND, EX-OR, EX-NOR gates. NOR and NAND gates as a universal gates.

Unit - 3: Boolean Algebra

Laws and identities of Boolean algebra, DeMorgan's theorem, Use of Boolean algebra for simplification of logic expression, Karnaugh map for 2,3,4 variable, Simplification of SOP and POS logic expression using K-map.

Unit-4:Combinational/SequentialCircuits

Half adder, Full adder, Parallel adder, Half subtracter, Full subtracter, 4 bit binary adder/subtractor, Multiplexer, Demultiplexer, Decoder, Encoder, Parity detector. Construction and working with timing diagram of bistable, monostable and astable multivibrator using logic gates. **Sequential Circuits:** Flip-flops: Construction and working of RSFF, CkRSFF, DFF, TFF, JKFF, and JKMSFF, Counters: Construction and working of Asynchronous, synchronous, up-down counter, Shift register and their types, ring counter and Johnson counter with their timing diagram.

Unit - 5: Architecture of 8086

Block diagram of 8086, Pin diagram of 8086, Minimum and Maximum mode, Addressing 5 modes, Instruction set: data transfer, arithmetic, logical, string manipulations, control transfer, unconditional branch, conditional branch, flag, processor control.

Unit - 6 : Assembly Language Programming

Assembler directives and operators, Assembly language programs, Machine level programs, Coding the programs, Programming with assembler, MASM, using debug, ALP examples.

BOOKS

1. Digital Systems, Principles and Applications by Tocci
2. Digital Electronics by Willam Gothman (PHI)
3. Microprocessors and Interfacing - Programming and Hardware by Douglas Hair
4. The 8086/8088 Family, Design, Programming & Interfacing by John Uffenbeck
5. Microcomputer Systems: The 8086/8088 family by Liu, Gibson

MCA. Semester-I

1.CSA-5 : System Analysis and Design

Unit-1

System Concept - System Concept, Elements of the system, types of System. **The system Development life Cycle** - Introduction, Consideration for Candidate Systems, Prototyping. **The Role of the System Analyst** - Introduction, Multi Faceted role of the Analyst, The Analyst/User interface, Rising position in system development.

Unit - 2:

System Planning & the Initial Investigation - Introduction, Base for planning in System Analysis, Initial investigation.

Information Gathering - Introduction, Information gathering tools.

The tools of Structured Analysis - Introduction, the tools of structured analysis, Pros & Cons of each tool.

Feasibility Study - Introduction, System performance definition, Feasibility study.

Unit - 3:

Cost Benefit Analysis - Introduction, Data analysis, Cost benefit analysis, Procedure for Cost benefits determination.

System Design - Introduction, The process of design, Design methodology, Major development activities, Audit considerations.

Input/output and Form Design - Introduction, Input design, Output design, Form design.

Unit-4:

File Organization & Data Base Design - Introduction, File structure, File organization, Database design, Data structure, Normalization and the role of Database administrator. **System Implementation (System testing & Quality Assurance)** - Introduction, the test plan, Quality assurance, Levels of quality assurance, Roles of Data processing auditor. **Implementation & Software Maintenance** - Introduction, Conversion, Post implementation review, Software maintenance.

Unit-5:

Hardware/ Software Selection & the Computer Contract - Introduction, The computer industry, A procedure for Hardware/Software selection, Financial considerations in selection, The computer contracts.

Project Scheduling & Software - Introduction, Project Management.

Security, Disaster/Recovery - Introduction, System Security, Disaster/Recovery planning, Ethics in System development.

BOOKS

1. System Analysis & Design - Awad, Galgotia Publication.
2. System Analysis & Design - Edward, Tata McGraw Hill.
3. System Analysis & Design - Don Yeats, McMillan.
4. Fundamentals of System Analysis and Design - Hawryskiwyez, PHI
5. Analyses and Design of Information System - Rajaraman.
6. Workbook on System Analysis & Design - Vinod Garg, PHI

MCA. Semester-II

2CSA-1 : Data Structures

Unit - 1:- Introduction to Data Structures

About Data structure - Information and Meaning, Binary and decimal integer, Concept of data types, data structure data representation/implementation, Abstract Data Type, Sequences of Value definition, ADT for varying length Data string. **Arrays, Records & Pointers** - About Arrays, Records & Pointers; their implementation in memory Arrays as an ADT, Using One dimensional Array & two Dimensional, About Record & Pointers. **Linked List** - Concept of singly Linked list, Operations on Linked List, inserting and removing nodes from a list, Array implementation of lists, limitation of the Array implementation over Linked List, concept of Doubly Linked List, generalized List.

Unit - 2 :- Stack & Queues

Stacks - Definition and example, primitive operations, Stack as an ADT, Implementation of Stacks as an Array and Linked List, operations on Stacks, Stacks Stored as a Linked List, Arithmetic expressions - Infix, Postfix and Prefix, Evaluating postfix expression, converting an expression from infix to postfix. **Queues** - Definition and examples of queues, Queues as an Abstract Data Type, Queues Stored as a Linked List, Circular Queue, Implementation of queues as an Array and Linked list, operations on Queues, Priority Queue & Dequeue.

Unit - 3 :- Recursion

Recursive definition and process, Factorial function, Multiplication of Natural Numbers, Fabonacci sequence, Properties of recursive Definitions, Writing recursive programs (The tower of Hanoi problem, converting prefix to postfix using recursion), Simulating recursion (Return from a function, implementing recursive function, simulation of factorial).

Unit - 4 :- Trees & Graphs

Trees - Definition of trees, Basic Terminology of trees, Binary Tree, Binary Tree Representation as an array & Linked List, Application of Trees, Binary Tree Traversal, Threaded Binary Tree, Height Balance Tree, B-trees, General Trees. **Graphs:** Basic terminology of Graphs, Implementation of Graphs as an Arrays & Linked List, Operations on Graphs, Graphs Traversals.

Unit - 5 :- Sorting and Searching

Sorting - Definition of sorting, Classification of Sorting Techniques, Different Sorting Techniques - Bubble sort, Quick Sort, Efficiency of quick sort, insertion sort, Selection sort, Merge Sort, Heap Sort.

Searching - Basic search techniques (Dictionary as an ADT, sequential searching, efficiency of sequential searching), Searching an ordered Table, Binary search.

Books :

1. Data Structures Using C and C++, by Tenenbaum, Second Edition, Prentice Hall India, New Delhi. (Chap. 1, 2, 3, 4, 6, 7)
2. Classical Data Structure by D. Samanta, Prentice Hall India, New Delhi.
3. C & Data Structure by Deshpande & Kakade, Dreamtech Publication.
4. Data Structures Using C++ (Schaum's Outline), McGraw Hill.
5. Data Structure - Schaum's Outline Series by Lipschutz [TMH]

MCA. Semester-II

CSA-2: Database Management Systems

Unit - 1:

Database Concept - Introduction, Data, Information, Metadata, Terminology of File, Association between Fields, Entities and their Attributes, Relationship, Records and Files, abstraction and Data Integration, Association between Files (Record Types), Conventional file Processing System, Database System, Components of Database Management System - Classification of DBMS users, DBMS Facilities, Structure of a DBMS, Database Access), Advantages and Disadvantages of a DBMS, The Three-level Architecture proposal for T3VS, Mapping between Views, Data Independence.

Unit - 2:

Data Models - Introduction, Data Association - (Entities, Attributes and Associations, Relationship among Entities, Representation of Association and Relationship), Data Model Classification - (Approaches to the Relational Model, Hierarchical Model & Network Model with an Examples), Entity-Relationship Model, **Concepts of File Organization** -Sequential Files, Index-Sequential Files, Direct File, Secondary Key Retrieval.

Unit-3:

The Relational Model - Introduction, **Relational Database:** Attributes and Domains, Tuples, Relation and Their schemas, Relation Representation, Keys, Relationship, relational operations, Integrity rules. **Relational Algebra:** Basic Operations, Relational algebra Queries. **Relational Calculus:** Tuple Calculus, Domain Calculus. **Relational Database Manipulations:**

Introduction, SQL, Data Manipulations in SQL, QUEL, data anipulations in QUEL, QBE, Data manipulations in QBE.

Unit - 4:

Relational Database Design - Relational Schema, Relational Design, Functional dependency, Normalization, First-Second-Third Normal Forms, Relation with more than one Candidate Key, Good and Bad Decompositions, Multivalued Dependency, Fourth normal Form, Fifth Normal Form. **Network Data Model:** The Architecture of DBTG 5 .stem, Schema & Subschema, and DBTG Data Manipulation Facility. **Hierarchical Data Model:** The tree Concept, Architecture of an IMS System, Data Manipulation.

Unit - 5:

Database Operations and Maintenance - Database Administrator (DBA), Database Security, Integrity And Control (User with Password and Complete/Limited Authorization, Encryption of Data). **Concurrency Control:** Problem of Concurrent Access, resource locking, Deadlock. **Database Recovery:** Restore, Backward & Forward Recovery. **Distributed Database:** Introduction, Data Distribution, Deadlock in Distributed Systems, Security and Protection, Homogeneous and Heterogeneous Systems. Knowledge Base and Database Systems, Expert Database Systems, Object Database System.

Books:

1. Database Management Systems By Panneerselvam [PHI]
2. An Introduction to Database Systems By Bipin C. Desai [Galgotia].
3. An Introduction to Database Systems By C.J. Date [Narosa]

MCA, Semester-II

2CSA-3 : Discrete Mathematics and Graph Theory

Unit - 1:

Fundamental - Sets and Subsets, Operations on Sets, Sequences, Division in the Integers, Matrices, Mathematical Structures. **Logic** - Proposition and Logical Operations, Conditional Statements, Methods of Proof, Mathematical Induction.

Unit – 2:

Mathematical Logic - Statements and Notation, Connectives, Normal Forms, The theory of Inference for the statement Calculus, The predicate Calculus, Inference Theory of the Predicate Calculus.

Unit – 3:

Counting - Permutations, Combinations, The pigeonhole Principle, Recurrence **Relations. Relations and Digraphs** - Product sets and Partitions, Relations and Digraphs, Paths in Relations and Digraphs, Properties of Relations, Equivalence Relations, Computer Representation of Relations and Digraphs, Manipulation of Relations, Transitive Closure and Warshall's Algorithm. **Functions** - Definition and Introduction, Function for Computer Science, Permutation Functions, Growth of Functions.

Unit – 4:

Graph Theory - Basic Concept of Graph Theory, Euler Paths and Circuits, Hamiltonian Paths and Circuits. **Other relations and Structure** - Partially Ordered Sets, Lattices, Finite Boolean Algebras, Functions of Boolean Algebras, Boolean Functions as Boolean Polynomials. **Trees** - Introduction, Undirected Trees, Minimal Spanning Trees.

Unit - 5:

Semigroups and Groups - Binary Operations Revisited, Semigroups, Products and Quotients of Semigroups, Groups, Products and Quotients of Groups. **Introduction to Computability Theory** - Languages, Finite-State Machines, Semigroups, Machines and Languages.

Books

1. Discrete Mathematical Structures By Bernard Kolman, Robert C. Busby & Sharon Ross [PHI].
2. Discrete Mathematical Structures with Applications to Computer Science By J.P.Tremblay & R. Manohar [Tata McGraw-Hill]
3. Combinational Mathematics By CJ. Liu.
4. Discrete Mathematics with Graph Theory By E.GOOaalre, [PHI]
5. Discrete Mathematics by J.K.Sharma (McMillan)
6. A First Course in Graph Theory by Choudham (McMillan)

MCA. Semester-II

2CSA-4 : Java Programming

Unit - 1:

Introduction to JAVA, Getting started with Java, Applets and application, Creating a Java applications, Creating a Java Applets, Object Oriented Programming in Java, Object and classes, Behavior and attributes, Creating a class, inheritance works, Single and multiple inheritance, Creating a subclass.

Unit - 2:

Creating a New Object, Accessing and setting class & instance Variable, Calling methods, References to Objects, Campaigning Objects, Determining the class of an object, Java class Library, Arrays, Conditional & Loops, How Applets and Application are different creating Applets, Passing Parameters to Applets.

Unit - 3:

Creating GUI using the Abstract Windowing Toolkit: Using Frames, Using Components, Events, Using Window Listener Interface, Learning about Container, Using Layout Managers & Handling AWT Events. The Graphics Class Drawing & filling, Text and Fonts, Creating Font Objects, Using color Objects, Creating Animation, in Java, Threads: What are they & the need, Writing with Threads.

Unit - 4:

Networking in Java, Windows, Menus & Dialog Boxes, Creating Links inside Applets, Opening Web Connection, the URL Connection Class, Sockets, Package, Programming in Large, Programming in Small, Heading Class, Interfaces.

Unit - 5:

Exception, Creating and Using Threads, The runnable Interface, Thread Tester, Named Thread Tester, Thread Scheduling, Input Stream, Output Stream.

Books:

1. Java - Complete References.
2. Java A Premier - E Balgurusamy.

3. Java Programming (for absolute beginner) - Russell - PHI.

4. An Introduction to Object Oriented Programming with JAVA - Thomas Wu,

MCA, Semester-II

2CSA-5 : Statistics and Numerical Mathematics

Unit- 1:

Introduction - Definition of Statistics, Importance and scope of Statistics, Limitations of statistics, Distrust of Statistics. **Statistical Data Collection** - Primary and Secondary data, Methods of Collecting Primary data, Sources and Secondary Data, Census and Sample Investigation. **Presentation of statistical Data** - Classification, Tabulation, Frequency Distribution, Diagrams and Graphs. **Frequency Distributions and Measures of Central Tendency** - Frequency Distribution, Continuous Frequency Distribution, Graphic Representation of a Frequency Distribution Average or Measures of Central Tendency or Measures of Locations, Requisites for an ideal Measure of Central Tendency - Arithmetic: Mean, Median, Mode, Geometric Mean and Harmonic Mean, Weighted Average, Relationship amongst different Averages.

Unit - 2:

Measures of Dispersion, Skewness and Kurtosis - Meaning and Significance of Dispersion, Methods of Measuring Dispersion - Range, Quartile, Mean Deviation, Standard Deviation, Coefficient of Skewness, Kurtosis, Coefficient of Dispersion, Coefficient of Variation. **Correlation and Regression** - Definition of Correlation, Scatter Diagram, Karl Pearson Coefficient of Correlation, Limits for Correlation Coefficient, Definition of Regression, Lines of Regression, Regression Curves, Regression coefficients, properties of Regression coefficients, Correlation Analysis vs. Regression Analysis.

Unit-3:

probability - Introduction, Definitions of various Terms, Mathematical or Classical probability, Statistical or Empirical Probability, Mathematical Tools, Sets and Elements of sets, Operations on sets, axiomatic Approach to Probability, Probability function, Mathematical Law of Addition of Probabilities and Conditional Probabilities, Independent Events, Bayes Theorem, Geometric Probability.

Unit - 4:

Random Variables and Distribution Functions - Definition of Random variable, Distribution function, Properties of Distribution Function, Discrete Random Variable, Probability Mass Function, Discrete Distribution Function, Continuous Random Variable, Probability Density Function, Continuous Random Variable, Continuous Density Function, Continuous Distribution Function. **Mathematical Expectation and Generation Function** - Definition of Mathematical Expectation, addition & Multiplication Theorem of Expectation, Co-variance, Expectation & Variance of a Linear Combination of Random Variables, Moment Generating Function, Some limits of Moment Generating Function, Theorem of Moment Generating Function, Cumulants.

Unit- 5:

Theoretical Discrete Distributions - Introduction, Bernoulli distribution, Binomial Distribution, Poisson distribution, Geometric Distribution. **Theoretical Continuous Distributions** - Introduction, Normal distribution, Gama Distribution, Cauchy's Distribution, and Central limit Theorem.

Books

1. Fundamental of Mathematical Statistics By Gupta & Kapoor [Sultan Chand & Sons].
2. Fundamental of Statistics By A.K. Agrawal & Sahib Singh.
3. Statistics for Management By Levin [PHI].
4. Statistics By Murray R. Spiegel.

MCA. Semester-III

3CSA-1: E-Commerce

UNIT-1

Overview of e-commerce: - Introduction, e-business, benefits of e-commerce, impact of e-commerce on business models, impact of e-commerce on value chain, three pillars of e-commerce e-commerce security. **E-commerce and the role of independent third party:** - Consulting practices and accountants independence, CPA vision project, New Assurance services identified by AICPA, The Elliott Committee and the Cohen Committee, three waves of e-commerce assurances on e-commerce, third-party assurance of web-based e-commerce, web site seal options,implocation for the accounting profession.

UNIT- 2

The Regulatory environment: - Introduction, Cryptography Issues, Privacy issues, Web linking, Domain name disputes, Internet sales tax, Electronic agreements and Digital signatures,Internet servies providers and International libel Laws, Implications for the accounting profession. **EDI, E-Commerce and the Internet:** - Introduction, Traditional EDI system ,Data transfer and standard, financial EDI, EDI system and the Internet, Impact of EDI-Internet application on the accounting profession.

UNIT - 3

Risk of Insecure Systems: - Introduction, Overview of Risk associated with Internet transaction, Internet associated risks, Intranet associated Risks, Social Engineering, Risk associated with business transaction, Risk associated with confidentially maintained Archival, Master file and reference data, Risk associated with Viruses and malicious code overflows, Implications for the Accounting profession. **Risk Management:** - Control Weakness vs. Control Risk, Risk management, Risk management paradigm, Disaster Recovery Plans, Implications for the accounting profession - evolution of Internet control, Framework, The, role of internal controls in risk management.

UNIT - 4

Cryptography and Authentication:- Messaging Security issues, Encryption Techniques, Key management, additional authentication methods, additional non-repudiation

techniques, implications for the accounting profession - Confidentiality, Message integrity, Authentication, non-repudiation, access controls, inter control and risk analysis. **Firewalls:** - Firewall defined, TCP/IP,,open systems interconnect (OSI), components of Firewall, typical functionality of Firewalls, Network topology, securing the Firewall, factors to consider in Firewall design, In-house solutions vs. commercial firewall software, limitations of the security prevention provided by firewalls, implications for the accounting profession.

UNIT - 5

Electronic commerce payment mechanisms: - The SET protocol, Magnetic strip cards, Smart cards, Electronic checks, electronic cash, implications for the accounting profession.

Intelligent agents: - Definition of intelligent agents, capabilities of intelligent agents, level of agent sophistication, agent societies, Intelligent agents & e-commerce, The online information chain, limitation of agents, implications for the accounting. **Web-Based marketing:** - The scope of marketing, business, marketing and Information technology strategy congruence, the four P's applied to internet marketing, the fifth "P" personalization, Internet marketing techniques, On-line advertising mechanisms, Web Site design issues, Intelligent agents and their impact on marketing techniques.

Books

1. Electronic commerce By Greenstein and Feinman - Tata McGraw-Hill
 2. E-commerce By Bhushan Dewan - S. Chand
 3. Introduction to Computers - Peter Norton's - TMH (4th Ed.)
 4. E-Business: A beginners Guide By Elsenpeter - Tata McGraw-Hill
 5. E-Commerce: The cutting Edge of Business by Bajaj & Nag - Tata McGraw-Hill
 6. E-Commerce by Deepak Goel - S. Chand
- E-Commerce, Business on the Net by Kamlesh Agarwal, McMillan.

MCA,Semester-III

3CSA-2: Data Communication & Network

Unit - 1: Data Communication

Data Transmission- Concept & Terminology, Analog & Digital data transmission, Transmission Impairment, Transmission Media. **Data Encoding-** Digital data, Analog Data, Digital signal, Analog signal. **Digital Data Communication-** Asynchronous and Synchronous transmission, Error detection technique, interfacing. **Data Link Control** -Line configurations, Flow control, Error control, Data link control protocols. Multiplexing-Frequency division multiplexing, Synchronous time division multiplexing.

Unit - 2: Data Communication Networking

Circuit Switching- Communication Networks, Circuit switching, Single Node network, Digital switching concept, Control Signaling. **Packet Switching-** Packet switching principles, Virtual circuits and Datagram's, Routing, Traffic control, X.25. **LAN & MAN-**LAN, MAN Technology, Bus/Tress and Star topologies, Optical Fiber Bus, Ring Topology, Medium Access Control Protocols, LAN/MAN standards.

Unit - 3: Communication Architecture

Protocols & Architecture- Protocols, The Layered Approach, OSI Model, TCP/IP protocol suite, System Network Architecture. **Internetworking-** Principles of Internetworking, The Bridge, Routing with Bridges, Connectionless Internetworking, Connectionless Internetwork protocol, Router-level protocol, Connection Oriented Internetworking.

Unit - 4; Protocols

Transport Protocols- Transport services, Protocol Mechanism, Network services, ISO Transport Standards, TCP & UDP, Light Weight Transport Protocol. **Session Service & Protocols-** Session Characteristics, OSI Session Service definition, OSI Session Protocol definition.

Unit - 5: Digital Network

ISDN & Broadband ISDN- The integrated digital network; Overview of ISDN, Transmission structure, User Access, ISDN protocols, Broadband ISDN.

Books

1. Data and Computer Communication by William Stalling, PHI Publication.
2. Data Communication and Network by Forouzan, Tata McGraw Hill.
3. Computer Networks, 3rd Edition by Tanenbaum, PHI Publication.
4. Internetworking with TCP/IP Vol-1 by Comer, PHI Publication.

MCA,Semester-III

3CSA-3: Design and Analysis of Algorithm

UNIT: 1

Elementary Algorithmics: Introduction - Problems and Instances - The Efficiency algorithms - Average and worst case Analyses - some examples. Asymptotic Notation: A notation for "the order of" - Other asymptotic notation - Conditional asymptotic notation - Asymptotic notation with several parameters - Operations on asymptotic notation.

UNIT : 2

Analysis of Algorithms: Introduction - Analyzing control structures - Average case analysis - Amortized Analysis - Solving recurrences.

Greedy Algorithms: Making change - General Characteristics of greedy algorithms - Minimum spanning trees and shortest paths - Knapsack Problem - scheduling.

UNIT-3:

Divide-and Conquer:Introduction-Multiplying large number-The general template-Binary search-sorting-Finding the median-matrix multiplication-Introduction to cryptography.

UNIT:4

Dynamic Programming: The Principle of optimality-making change the knapsack problem-shortest paths - Chained matrix multiplication-approaches using recursion – Memory function.

UNIT5

Back Tracking & Branch Bound: Traversing trees - Depth first search of directed and undirected graphs - Breadth first search - Back tracking - Branch and bound - the minimax

Principle, Introduction to NP - Completeness: Classes P and NP - Polynomial reductions Complete Problems NP-Hard Problems - Non-deter- ministic algorithms

TextBook:

Fundamentals of Algorithmic.

Gillies Brassard & Paul Brately.

Prentice-Hall (India) Ltd,

References: Fundamentals of Computer Algorithms.

Ellis Horowitz & Sartaj Sahani.

GalgotaPublications.

Computer Algorithms: Introduction to Design & Analysis.

Sara Baase & Alien Van Gelder. ;

Addison Wesley Publishing Company.

MCA. Semester-III

3CSA-4: Operation Research

Unit - 1:

Introduction to Operation Research (OR) - Origin and Development of OR, Nature of

CR Characteristics of OR, Classification of Problems in OR, Models in OR, Phases of OR, uses and Limitations of OR, Methodologies in OR, Applications in OR. **Linear Programming** - Concept of Linear Programming Model, Mathematical Formulation of the problem, Graphical solution Methods. **Linear Programming Methods** - Simplex Methods, 5 5 M methods, Dual Simplex Method, Two Phase Methods. **Duality in Linear Programming** - Formulation of Dual Problem, application of Duality.

Unit -2:

Transportation Problem - Mathematical Model for Transportation Problem, Types of spoliation Problem. **Assignment Problem** - Zero-One programming model for assignment Problem, Types of assignment Problem, Hungarian Method, Branch and Bound technique for Assignment Problem. **Game Theory** - Terminologies of Game Theory, Two re-sen Zero-Sum Games, The Maximin-Minimax Principle, Games without Saddle Points Mixed Strategies, Graphical Solution of $2 \times n$ and $m \times 2$ Games, Dominance Property.

Unit -3:

Decision Theory - Introduction, Decision under Certainty, Decision under Risk, Decision Under Uncertainty, Decision Tree. **Network Scheduling By CPM/PERT** - Introduction, Basic Concept, Constraints in Network, Critical Path Methods (CPM), PERT Network, PERT Calculation, Time-Cost-Trade-Off Aspects in Network Technique, Advantage of Network

Unit -4:

Inventory Control -Introduction, Inventory Control, Selective Control Techniques, Types of Inventory, Economic Lot Size Problem, Problem of EOQ with shortage, Inventory Control Techniques-Uncertainty Demand, Inventory Control Techniques-Stochastic Problem, Inventory Control with Price Breaks.

Unit -5:

Queuing Theory - Introduction, Terminologies of Queuing System, Characteristics of Queuing System, Poisson Process and Exponential Distribution, Classification of Queues, Definition of Transient and steady States, Poisson Queues, Non-Poisson Queuing Systems, Cost-Profit Models in Queuing, Queuing Control.

Books

1. Operation Research By Kanti Swarup, P.K.Gupta, Man Mohan [Sultan].
2. Operation Research By R. Panneerselvam [PHI].
3. Introduction To Operation Research By Billy E. Gillett [Tata McGraw-Hill]
4. Operation Research By Hira Gupta.
5. Operation Research Problems & Solutions by Sharma J.K., Macmillan
6. Operation Research Theory & Application by Sharma J,K, MacMillan.

MCA. Semester-III

3CSA-5: Database Administration

Unit - 1; Introduction to Oracle Database Administration

Introduction to relational database management system, Database modeling and relational database design, Creating databases, Background processes, Internal database structure, Database file layout, Verification of I/O estimate, Database space usage overview, Resizing data file.

Unit - 2: Oracle SQL and PL/SQL

Basic SQL and PL/SQL concepts terminology and programming, Enhancements SQL, Enhancement to Globalization, Writing queries, Using procedure builders, Data Manipulation language (DML), Data definition language (DDL).

Unit - 3:

Oracle Database Architecture and Administration Oracle database architecture, Design, Creation, Migration and Management of Oracle Databases and related database schemes, Data Dictionary views

and standard packages, Maintaining the control, Redo Log files, Managing Table spaces and Data Files, Storage structure and relationships, Managing rollback segment, Managing tables, Indexes, Managing data Integrity, Managing password security and resources, Managing users, Privileges, roles.

Unit - 4: Oracle Backup and Recovery Strategies

Backup and recovery considerations, Oracle recovery structure and processes, Oracle backup and recovery configuration, Physical backup, Complete recovery of an Oracle database, Incomplete recovery of an Oracle database with Archiving, Oracle Export / Import utilities, Oracle standby database.

Unit - 5: Oracle Tuning and Troubleshooting

Oracle performance tuning methodology, Oracle alert and trace files, Tuning the shared pool, Buffer Cache, Redo Log buffer, Database configuration and I/O issues, Using Oracle Blocks efficiently, Optimizing sort operations, Rollback segment tuning, Monitoring and detecting lock contention, SQL issues and tuning considerations for different application.

Note: Oracle Si version to be used.

BOOKS

1. ORACLE DBA Handbook - Oracle Press (Tata McGraw Hill Publication).
2. The Complete Reference SQL - Groff Weinberg (Tata McGraw Hill Publication).

MCA Semester-IV

4CSA-1: Computer Hardware Interfacing

Unit - 1: Multiple Microprocessor System and Buses

8086/8088 maximum and minimum modes, DMA data transfer. Interfacing and refreshing dynamic RAM, math coprocessor-8087 and I/O processor-8089. Multiple bus Microcomputer systems, VME bus concepts, IEEE 488 HPIB, PC bus, EISA bus.

Unit - 2: Data Communication

Asynchronous serial data communication (Intel 8251 chip study), serial data transmission method and standards: RS-232, RS-422, RS-423A and RS-499.

Unit - 3: Microcomputer System Peripherals - I

CRT terminals, Graphic terminals, choice of displays MGA, CGA, EGA and monitors
(Monochrome and color)

Unit - 4: Microcomputer System Peripherals - II

Floppy disk, Hard disk, Optical disk, data storage, Printer mechanism, speech synthesis
Hand recognition with a computer.

Unit - 5: Hardware Layout of IBM PC/ XT

Mother board, disk control, multi-serial I/O card, Fax and Telex card EGA/VGA.

Books

- 1 Microprocessor and Interfacing by Douglas Hall
- 2 Inside the IBM PC by Peter Norton
- 3 IBM PC/XT Hardware: Reference Manual
- 4 Microprocessor systems: The 8086/8088 Family Architecture, Programming and Design by Liu and Gibson
- 5 Advance MS-DOS by Ray and Duncan

MCA Semester-IV
4CSA-2: Distributed Database Management System

UNIT: 1 INTRODUCTION

Distributed data processing; Distributed database systems (DDBS); Problems of DDBSs; Completing factors and problem areas -

UNIT: 2 DISTRIBUTED DBMS DESIGN AND ARCHITECTURE

DBMS standardization; Architectural models for DDBMSs; DDBMS architecture and Global directory issues. Alternative design strategies; Distributed design issues; Fragmentation and allocation.

UNIT: 3 OVERVIEW OF QUERY PROCESSING

Query processing problems; Objectives of query processing; Complexity of relational algebra operators; Characterization of query processors; Layers of query processing

UNIT: 4 TRANSACTION MANAGEMENT

Destination of a transaction; Problems of transactions; type of transactions; and Architecture revisited

UNIT: 5 DISTRIBUTED CONCURRENCY CONTROL

Serilizability theory; Taxonomy of concurrency control mechanisms; Lock- ing-based concurrency; Control algorithms; Timestamp-based concurrency control; Optimistic concurrency control; deadlock management; and Relaxed concurrency

TEXT BOOK

Principles of Distributed Database Systems; 2nd Edition

Authors: M. Tamer Ozsu and Patrick Valduriez

Publishers: Person Education Asia

Reference

Distributed Database; Principles & Systems Authors: Stefano Ceri and Giuseppe Pelagatti Publications: McGraw-Hill International Editions

MCA. Semester-IV

4CSA-3: Computer Graphics

Unit – 1:

Geometry & Line Generation - Introduction, Points and Lines, Plane and coordinate, Line Segments, Perpendicular Lines, Vectors, Pixels and Frame buffers, Vector generation, Character Generation, Displaying the Frame Buffer. **Graphics Primitive** - Introduction, Display Devices, Primitive Operations, **Polygons** - Introduction, Polygons, Polygon Representation, Entering Polygon, Filling Polygons. **Transformations** - Introduction, Matrices, Scaling Transformation, SIN & COS, Sum of angles identifier, rotation, Homogeneous Coordinates and Translation, Rotation about an arbitrary point, Other Transformation, Display Procedures. **Segments** - Introduction, The segment Table, Segment creation, Closing the Segments, Other Display, file Structure, Raster Technique.

UNIT- 2:

Clipping Techniques - Introduction, Viewing Transformation, Viewing Transformation Implementation, Clipping, Clipping of Polygons, Adding clipping to the system, avoiding division, generalized clipping, Position relative to an arbitrary Line Multiple Windowing. Interaction - Introduction, Hardware, Input Device handling algorithm, Event Handling, Sample Devices, Delectability attributes, Simulating a locator with a pick, Pick with a Locator, Echoing, Interactive Techniques.

Unit - 3:

3-Dimension Geometry - Introduction, 3d Geometry, Primitives and Transformation, Rotation about an arbitrary axis, Parallel Projection, Perspective Projection, Viewing Parameters, Conversation to View Plan Coordinate, 3d Viewing Transformation, Special Projection. **Hidden Surface and Lines** - Introduction, Back Face Removal, Pointers Algorithm, Collection of Polygons, Remembering the Style, Hidden Surface Check.

Unit – 4:

Shading - Introduction, Diffusion, Illustration, Point-Source Illustration, Specular Reflection, Transparency and Shadows. **Curves** - Introduction, Curve Generation,, Implementation, Interpolating Polygon, b-Splines and Curves.

Unit -5:

Visible surface detection- Classification of visible surface detection algorithm, Back-Face detection, Depth buffer method, A-Buffer method, Scan Line method, Depth-sorting method, BSP Tree method,

Area subdivision method, Octree method, Ray-Casting method, curved surface, Wireframe method, Visibility detection method.

Books:

1. Computer Graphics By Steven Harrington [Tata McGraw-Hill].
2. Computer Graphics By Hearn Baker [PHI]
3. Interactive Computer Graphics By Newman & Sproul.
4. Computer Graphics By Rogers [Tata McGraw-Hill].

MCA. Semester-IV

4CSA-4: Distributed Operating System

UNIT- 1: Fundamentals

Introduction to Distributed Computing system, Distributed Computing system model, Advantages of Distributed Computing System, Introduction to Distributed Operating System, Introduction to Distributed Computing Environment.

UNIT- 2: Message Passing

Introduction, Characteristics of Good message passing system, Issues in IPC by message ; passing, Synchronization, Buffering, Multidatagram messages, Encoding and Decoding of message data, Process addressing, Failure handling, Group Communication.

UNIT- 3: Remote Process Calls (RPC)

Introduction, RPC Model, Implementing RPC Mechanism, Stub generation, RPC messages, Types of RPC' s, Marshaling arguments and results, Server Management, Call semantics, Communication Protocols for RPC' s, Client- Server Binding, Exception handling Security.

UNIT- 4: Distributed Shared Memory f DSM)

Introduction, Architecture of DSM, Design and Implementation issues of DSM, Granularity, Structure of shared memory space, Consistency models, Replacement strategy, Thrashing.

UNIT- 5: Resource. Process Management and Synchronization

Introduction Resource and Process Management, Characteristics of good global Scheduling algorithm, Various approaches for resource management, Process migration, Threads, Clock synchronization, Event ordering, Mutual Exclusion, Deadlock, Election algorithm.

BOOKS:

Distributed Operating System, Sinha, PHI Publication.

MCA. Semester-IV

4CSA-5: C# and Dot.Net

Unit -I: - C Sharp Concepts

Introduction to C Sharp, the main method, program output, printing & formatting output, compilation & execution, Namespace Declaration, Common Language Platform, General structure of C Sharp program, Value type, Default Constructor, Struct type, Enumeration type, Reference type, Class Type, Object Type, String Type, Interface type, Array type, Delegate type, Predefined types, Concept of Boxing & Unboxing, Array types, Variables & Parameters, Operands, Statements. Expression, operators.

Unit -II: - C Sharp Classes and Methods

C Sharp Objects, Classes, Objects as Data type, creating classes, Using an Object member function, Providing constructor, Types of class members, Inheritance, Controlling access to Members of class, Garbage collector, implementing classes, Class library and Name Space, Methods, Structure of a method, Method overloading, implementing method, class containing functions, statements and control.

Unit -III: - C Sharp - Struct. Enum. Arrays and String

Struct types, Struct declaration, Struct modifier, Struct Interface, Enums, Enumerator Base type, Enum modifiers, Enum Members, Enum values and operations, Concept of Arrays, Passing array as parameters, Array initialization, Accessing array member, Arrays object, Array list (adding, deleting, searching data from array list), String operations, converting objects to string, String builder, File and folder operations, reading and writing text files, reading and writing binary files,

Unit- IV: - DOT NET f.NET Overview

Introduction to .NET, the origins of .NET, .NET framework overviews (a common substrate for all development, key design goals, Mega Data, Multiple language integration and

support, Name spaces), .NET framework Base classes, User and program interfaces (user interface, Windows Forms, Web Forms, Console application), Program interface, Web Services.

Unit - V; -

Introduction to Common Language Runtime (CLR) Requirement of .NET application (Assembly, Module, Type), common type systems (Custom types, Boxing & Unboxing value types), Metadata (Attributes, Custom Attributes), Managed Data (Managed Heap, Garbage collector), Garbage collector optimization, pinning objects.

BOOKS:

1. C # (C Sharp) Programming, by V. K. Jain, Dreamtech Press, New Delhi. (Chap. 4,5,6,7,8,10,11,12).
2. Programming in C# by Balguruswamy, Tata McGraw Hill.
3. Introduction to DOT NET (.NET), by James Conard et. Al., Shroff Publisher and-Distributors Pvt. Ltd (Mumbai), (Chap 1,2).
4. Introducing Microsoft Dot Net - David Platt, PHI Publication.
5. C # (C Sharp) Complete Reference - Schildt, Tata McGraw Hill

MCA. Semester-V

5CSA-1 : Data Warehousing And Data Mining

Unit - 1

Characteristics of A Data Warehouse, Data Mart, Type of Data Mart, Loading a Data Mart, Metadata for a Data Mart, Data Model for a Data Mart, Maintenance of a Data Mart, Nature of a Data in a Data Mart, Software Components for a Data Mart, Tables in Data Mart, External Data, Reference Data, Performance Issues, Monitoring Requirements for a Data Mart, Security in Data Mart.

Unit - 2

OLTP and OLAP Systems, Data Modeling, Star Schema for Multidimensional view, Multifact Star Schema, Categories of OLAP Tools, Managed Query Environment (MQE), Cognos Powerplay, IBI Focus Fusion, Pilot Software, Arbor Web, Information Advantage Web OLAP, Micro strategy DSS Web, Brio Technology, OLAP Tools and the Internet

Unit - 3

Data Mining: Introduction, From Data Warehouse to Data Mining, Steps of Data Mining, Data Mining Algorithm, Database segmentation, Predictive modeling, Link Analysis, Tools for Data Mining.

Unit - 4

Developing a Data Warehouse, Building a Data Warehouse, Data Warehouse Architectural Strategies, Design Considerations, Data Content, Metadata, Distribution of Data, Tools for Data Warehousing, Performance Considerations, Crucial decisions in Designing a Data Warehouse, Various technological considerations.

Unit-5

Application of Data Warehousing & Data Mining, National Data Warehouses, Census Data, Areas for Data Warehousing and Data Mining with Case studies.

- Case Study -
- 1: Data Warehousing in State Government.
 - 2: Data Warehousing for Ministry of Commerce.
 - 3: Data Warehousing in Hewlett-Packard.
 - 4: Data Warehousing in World Bank,

Books

1. Data Warehousing - C.S.R. Prabhu, PHI Publication.
2. Web Warehousing & Knowledge Management - Mattison, fata McGraw Hill.
3. Data Warehousing - Amitesh Sinha, Thomson Publication.
4. Data Mining - Claude Seidman, PHI Publication.

MCA. Semester-V

Embedded Systems

Unit - 1

Introduction to embedded systems, Microprocessor, Micro controllers and DSPs, Types of memory used, Types of RAM and ROM, Memory mapped IO and I/O mapped IO, Compilers, Debuggers, Emulators and Simulators, Real Time Systems, Soft and Hard real-time systems, Real-time Operating Systems, Windows CE Vs VxWorks, Characteristics of Embedded System, Throughput, Response, Reliability, Memory Space, Power consumption, Cost Issues in Embedded System, Testing, Debugging, Installation

Unit - 2

Introduction to Windows CE.NET Platform Builder, Creating a custom OS using Windows CE.NET, Role of OEM Adaption Layer, Configuration Files, Boot Loader and Device Drivers, Introduction various OS features, Debugging the custom OS, Creating and Adding Board Support Packages (BSPs), Catalog Editor

Unit - 3

Creating and Exporting MFC SDKs, Creating embedded applications in VC++ , Introduction to .NET and C#, Creating applications in C#, Writing multithreaded applications, Testing multithreaded applications using Remote Kernel Tracker, Synchronization

Unit - 4

Windows CE.NET Architecture, Processes and Threads, Memory management, Virtual Memory, Heap and Stack, Real-time features, Interrupt latency, Nested Interrupts, Interrupt Priorities Priority Inversions

Unit - 5

Interrupt Service Routines, Interrupt Service Threads, Introduction to Windows CE.NET Device Driver Development, Development of COM components, DCOM components and ActiveX controls in Windows CE.NET, Internationalization, Introduction to Real-time communication

BOOKS

1. Programming Microsoft windows CE - Douglas Boling.
2. Microsoft .NET - David Platt (PHI).
3. Microsoft .NET Framework - Chakraborti, Sandhu (PHI).
4. Introducing .NET - James Conard et. Al. (Wrox Publication).
5. The Complete Reference C# - Schildt (TMH).

MCA. Semester-V

5CSA-3: Network Security

UNIT :1

Network Security Fundamentals: Introduction, security Vulnerabilities and Threats, Classification of Security Services.

Cryptography: Encryption Principles, Conventional Encryption DES, IDEA, Algorithms, CBC, Location of Encryption Devices key Distribution.

UNIT :2

Message Digests and Checksums/Message Authentication, Message Digests, Hash Functions and SHA, CRCs. Public Key Systems: RSA, Diffie-Hellman, DSS, Key management.

Intruders: Intrusion Techniques, Intrusion Detection.

Viruses, Access Control and Management, Access Control Policies, Access Control

Mechanisms, Types of Viruses, Anti-virus Techniques

UNIT :3

Number Theory: Modular Arithmetic, Euclid Algorithm, Euler Theorem, Chinese Remainder Theorem. Confidentiality, Integrity, Non-Repudiation, Mechanisms, Protocol Requirements, Options, Non-Repudiation - Process Non-Repudiation - Delivery.

UNIT :4

Authentication, Password-Based Authentication, Address-Based Authentication, Certificates, Authentication Services, Email Security, Threats, PGP, S/MIME. Firewalls, Design Principles, Packet Filtering, Access Control, Trusted Systems, Monitoring and Management.

UNIT :5

IP Security: IP Overview, IP security Architecture, Authentication Header, Encapsulating Security Payload, Key Management, Network Management.

Web Security, Web Security Threats, Web Security Requirements, Secure Socket Layer and Transport Layer Security, Secure Electronic Transactions.

Text Book:

Network security Essentials: Applications and Standards.

William Stallings.

Pearson Education.

Reference:

Cryptography and Network Security.

William Stallings.

Pearson Education.

MCA. Semester-V

Elective - 1 (A) Legal Aspects of IT

Unit -1

Cyber Law: Introduction, Defining Cyber Law, Legal Identity - Netizen, Private? International Law in Cyberspace. IT Law: History of Information Technology Act 2000, About IT Law, IT Act 2000 and E-mails,

Unit - 2

Cryptography, Application of Cryptography, IT Act 2000 and Technology. **Business:** Classification of Internet Business Models, E-Business models, E-Commerce and Security, Online payment facilities, IT Act 2000 and E-Commerce. Electronic Contract: E-Agreement and Web Surfing, Terms of service contracts, General precautions, Cyber Contracts, IT Act 2000 and E-Contracts.

Unit - 3

Collecting Personal information, Means of identifying personal identity, Online Ads and Profilers, Protecting Privacy policy for an E-Commerce site, Privacy Law and Problems, Personal Data protection Mark, IT Act 2000 and Issue of Piracy.

Unit - 4

Digital content rights, Copyright Infringements, Steps to protect the content on WWW, Reconceptualizing Copyright in a digital society, Software Patents, Domain name system and Trademarks, Emergence of Cyberspace Trademark Law, IT Act 2000 and Issue of Copyright, Patent and Trademark.

Unit - 5

Age of Cyber Crime: The Interface, Establishing the nature of Offence, Economy/ Cost of Cyber Crime, Future Impact, Strategy to Combat Cyber Crime, IT Act 2000 and Cyber

Crime

Books

1. Handbook of Cyber Laws - Vakul Sharma, McMillan.
2. IT and the Indian Legal System - Kamlesh Agrawala, McMillan.
3. E-Security and You - Oberoi, Sundeep, Tata McGraw Hill.
4. Information Warfare: How to Survive Cyber Attacks - Erbschloe, Tata WcGraw Hill.
5. Cyber Law - Rakesh Sood, Tata McGraw Hill.

MCA. Semester-V

5CSA-4: Elective - 1 (B) Software Engineering

Unit - 1:

Introduction to software Engineering-Trie Role of Software Engineering, History of Software Engineering, The Role of Software Engineer, The Software Life cycle, The Relationship of Software Engineering to Other Areas of Computer Science. The Relationship of Software Engineering to other Disciplines. **Software: Its Nature and Qualities**- Classification of software Qualities, Representative Qualities, Quality Requirements in Different application Areas, Measurement of Quality.

Unit – 2

Software Engineering Principles-Rigor and Formality, Separation of Concern, Modularity, Abstraction, Anticipation of Change, Generality, Instrumentality. **Software Design**-Software, Design Activity and its Objectives, Modularization Techniques, Object-Oriented Design.

Unit - 3;

Software specification-The Uses of Specification, Specification Qualities, Classification of Specification Styles, Verification of specifications, Operational Specifications, Descriptive Specifications. **Software verification**-Goals and Requirement of Verification, Approaches to Verification, Testing, Analysis, Symbolic Execution, Debugging, Verifying Other Software Properties.

Unit – 4

The Software Production Process – Software Production, Process Models: Waterfall Mode, Evolutionary Model, Transformation Model, and Spiral Model, Organizing the Process. **Management Of Software Engineering** – Management Functions, Project Planning, Project Control, Organization, Risk Management.

Unit – 5:

Software Engineering Tools and Environments- Historical Evolution of Tools and Environments, Classification of Software Tools and Environments , Representative Tools, The role of programming Language in the Environment, Some Sample Tools and Environment.

Books:

1. Fundamentals of Software Engineering By Ghezzi, Jazayeri and Mandrioli [PHI]
2. Software Engineering By Pressman [Tata McGraw-Hill].
3. Fundamentals of Software Engineering By Mail
4. Software Engineering Concept By Richard Fairley [Tata McGraw-Hill]

MCA. Semester-V

5CSA-4: Elective - I(C) System Management UNIT – 1

Unit-1

Management Planning And Control - History of management thought, Classical principles of management, modern management principles, management movement, general management, scientific management, engineering management, manufacturing management, Systems management, time management, managerial process of planning, management functions, management control, skills of managers, responsibilities of management, hidden practices of management, managerial effectiveness, self-evaluation of managerial approaches, checklist of competent manager. **Organization Planning, Design And Development** -Introduction, Organization planning, Organization Design, Organization Development. **Social Responsibility and Ethics of Management and Society** - Operating in a pluralistic society, Social responsibility of managers, ethics in managing.

UNIT - 2

Human Resource Planning And Management - Human resource planning, job analysis, Acquisition of Human Resources, Training and Development, human Resource motivation, Organization development and change, Group Behavior, Working life and its quality, Communication, Leadership, Workers participation in management, Promotion policy, job evaluation, Collective Decision-Making, Trade Unions, Collective Bargaining, Industrial Disputes, Industrial Safety, Health and Safety at work.

UNIT – 3

Total Quality Management-Introduction, Total Quality Management, ISO 9000, Quality Audit. **Product Design and development**-Introduction, Design of the product, new product development. **Maintenance and System Reliability**-Introduction, objective of maintenance, Failure Analysis, Maintenance system, types of maintenance, performance criterion for maintenance system, maintenance planning and control, Maintenance strategy, system approach to maintenance management, Impact of terotechnology on maintenance management, maintenance costing and budgeting, maintenance performance indices.

UNIT - 4

Privatisation, Liberalisation and Globalisation-Introduction, reasons for Privatisation, determinants and constraints of Privatisation, global experience, necessary precautions in Privatisation, some impacts of Privatisation in the global context, methods of Privatisation, disinvestments techniques, Privatisation from within, fringe or cold Privatisation, regulatory mechanism consequent upon Privatisation, Liberalisation, Liberalisation in practice, Globalisation, Globalisation and Indian Corporate, Implications and Impact, Introduction to Privatisation policy and Practice in India. **International Management and the future**-International Management in selected countries, Japanese Management and Theory Z, International Management and Multinational Corporations, The managerial functions in International Business, Toward a Unified, Global Theory of Management.

UNIT - 5

Communication Skills: Language and communication: Linguistic Communication, Barriers to Communication, Importance of Communication Introduction. **Non-Verbal Communication:** Personal Appearance, posture, Gestures, Facial Expression, Eye Contact, Space Distancing. **Communication in Organization:** Pattern of Communication, Management of Information. **Dyadic Communication:** Face to Face Conversation, Telephonic Conversation, Interviews, instructions, Dictation. **Meeting:** Purpose, Procedure, Chairmanship, Participation, And Physical Arrangement. **Seminars and Conferences:** Types of Group Discussion, Regulating speech, conducting seminars, organization confererices, evaluating Oral presentation,. Group Discussion, Audio-Visual Aids.

Books

1. Management of Systems by Gupta? ~ bharna-Macmillan, Essential Of management by Koontz & Wehrich -TMH.
2. Human Resource development and Management by Sheikh - S. Chand, Management of Systems by Gupta & Sharma-Macmillan, Business Administration by Applebay - Macmillan, Industrial Management by Chopde & sheikh - S. Chand.
3. Management of Systems by Gupta & Sharma-Macmillan, Industrial Management by Chopde & sheikh - S. Chand,

4. Essential Of management by Koontz & Weihrich - TMH, Public Enterprise Management and Privatisation.
5. Developing Communication Skills by K Mohan & Banerji - Macmillan, Profession communication Skills by Bhatia & Sheikh - S. Chand.

MCA. Semester-V

5CSA-5: Elective - II (a) Visual Basic .NET

UNIT - I

Introduction to Visual Basic .NET (VB .NET) - The .NET Framework, The .NET Programming Framework, .NET Languages, The .NET Class Library, About ASP .NET, Basic difference between C# and VB .NET, Visual Studio .NET, About VB .NET, Windows Applications using VB .NET, Object Oriented concept in VfiJINEJ.

UNIT - 2

Programming building blocks - Variables, Data Types, Assignment Operators, Arithmetic Operators, Comparison Operators, Logical Operators, Type Conversion, Control Structure - if Statements, controls used for if statements, **Loop Structures** –For Next Statements, While End Statements, Do Statements.

UNIT3:

Programming Concepts-Arrays-Declaring an array, useful Array function, properties & Methods, Resizing an array. **Procedures**-Types of Procedures, Built-in Vs Programmer defined Procedures, Methods Contrasted. **Subroutine**-Declaring a Subroutine, Calling the subroutine. **Functions**-Declaring Functions, Calling functions. Arguments-Passing arguments by Val & by Ref, optional arguments, parameters array. **Procedure Overloading.**

UNIT - 4

User Interface - Helper forms, Message process, Dialog Process, Owned Forms. **Menus**-Creating a menu, Functionality to the menu items, Enhancing the menu, Disabling Items on Windows form menus, creating context menu, Add functionality to the menu items. **Toolbar**-Adding the toolbar and buttons, Defining an Icon for a toolbar and buttons, Defining an ICON for a Toolbar Button, Adding Functionality to the toolbar.

UNIT - 5

Error handling & Prevention - Structured Exception Handling - Exception, Structured Vs Unstructured Exception Handling, Try Catch ... Finally Statement, Exception Class. **Debugging** - Break mode, starting Debugging, controlling the flow during debugging, Debugging Tools.

BOOKS

1. Visual Basic .NET by Jeffrey Kent - Tata McGraw- Hill.
2. The Complete Reference - Tata McGraw- Hill.

MCA. Semester-V

5CSA-5: Elective - II (b) ASP .NET

UNIT - 1

Introduction to ASP .NET - The .NET Framework, The .NET Programming Framework, .NET Languages, The .NET Class Library, About ASP .NET, Basic difference between C# and VB .NET, Data Types, **Declaring Variables** - Initializers, Arrays, Enumerations. **Variable Operations** - Advanced Math Operations, Type Conversions. **Object-Based Manipulation** - String Object, DateTime Object, TimeSpan Object & Array Object. Conditional Structures, Loop Structures, **Functions & Subroutines** - Parameters, Procedure Overloading, Delegates.

UNIT - 2

The Basics about Classes - Shared Members, A Simple Class, Adding properties, Basic Method, Basic Event, Constructors. **Value Types & Reference Types** - Assignment Operations, Equality Testing. **Advanced Class Programming** - Inheritance, Shared Members, Casting. **Understanding Namespaces and Assemblies** - Importing Namespaces, Assemblies.

UNIT - 3

Web Server and user - Installing IIS. IIS Manager - Creating a virtual Directory, Virtual Directories and Applications, Folder Settings, Adding virtual directory to your Neighborhood. **Installing ASP .NET. ASP .NET Applications** - ASP .NET file Types, The bin directory, Code-Behind, The Global.asax Code-Behind, Understanding ASP. Net Classes, ASP .NET Configuration

UNIT - 4

Web Form Fundamentals - A Simple Applets, Improving the Currency Converter, HTML Control classes, Page Class, Assessing HTML Server Controls. **Web Controls** - Basic Web Control classes, AutoPostBack and Web Control Events, A Web page Applets. **Validation and Rich Controls. State Management. Tracing, Logging and Error Handling** -Common errors, .NET Exception Object, Handling Exceptions, Throwing your own Exceptions, Logging Exceptions, Error pages, Page tracing.

UNIT - 5

Advanced Asp. NET -

Component-Based Programming - Components Jargon, Creating Simple Component, Properties and State, Database Components, Using COM Components. Custom Controls-User Controls, Deriving Custom controls. **Caching and Performance tuning** - Designing for scalability, Profiling, Caching, output Caching, Data caching. Implementing Security-Determining Security Requirements, The ASP .NET Security Model, Forms Authentication, Windows Authentication, Impersonation. **The IbuySpy Case Studies.**

Books

1. The Complete Reference-ASP .NET by Matthew MacDonald-Tata McGraw- Hill.