

# North Maharashtra University, Jalgaon

Syllabus for

## Dual Degree

### Master in Computer Application

( With Effect from June – 2014 )

<b>Duration of the Course</b>	: Five Years
<b>Pattern</b>	: Semester Pattern
<b>Examination Pattern</b>	: 75 (External) + 25 (Internal)

#### **Career Opportunities :-**

The career opportunities after completing Dual Degree in MCA are quite huge. Many major national / multinational firms take in aspirants who have accomplished their graduation in these fields. Leading MNC's offer attractive packages to the aspirants. Candidates who have successfully completed Dual Degree in MCA can get job in Government organizations, Banks, Multinational / National firms, Education Institutions, Research Organization and Organizations where ICT has become mandatory. Candidates can play various roles as per their competence like software Engineer, Application Developer, Web Designer, Database Administrator, System Analyst, System Administrator, Data Center Administrator, Software Quality Assurance Engineer etc.

**Semester- I**

- CA-1.1 Computer Fundamentals & Office Automation
- CA-1.2 Basics of Accounting
- CA-1.3 Programming Using C
- CA-1.4 Mathematical Foundation
- CA-1.5 Essentials of Web Designing
- CA-Lab- 1 Lab on C
- CA-Lab- 2 Lab on Web Designing

**Semester- II**

- CA-2.1 Linux Operating System
- CA-2.2 Discrete Mathematics
- CA-2.3 System Programming
- CA-2.4 OOAD
- CA-2.5 Programming Using C++
- CA-Lab- 3 Lab on Linux OS
- CA-Lab- 4 Lab on C++

**Semester- III**

- CA-3.1 System Analysis and Design
- CA-3.2 DBMS
- CA-3.3 Data Structures
- CA-3.4 Computer Network
- CA-3.5 Operating System
- CA-Lab- 5 Lab on DBMS
- CA-Lab- 6 Lab on DS

**Semester- IV**

- CA-4.1 E-Commerce
- CA-4.2 Java Programming
- CA-4.3 Management Information System
- CA-4.4 VB.Net
- CA-4.5 Computer Organization & Architecture
- CA-Lab- 7 Lab on Java Programming
- CA-Lab- 8 Lab on VB.NET

**Semester- V**

- CA-5.1 Web User Interface Design
- CA-5.2 Theoretical Computer Science
- CA-5.3 Software Engineering
- CA-5.4 Computer Graphics
- CA-5.5 Computer Animation
- CA-Lab- 9 Lab on Web UI Design
- CA-Lab- 10 Lab on Computer Graphics and Animation

**Semester- VI**

- CA-6.1 ERP & SAP
- CA-6.2 PHP & MY-SQL
- CA-6.3 Software Testing
- CA-6.4 Data Warehousing and Mining
- CA-6.5 Cyber Security
- CA-Lab-11 Lab on PHP & MY-SQL
- CA-Lab-12 Project & Viva Voce

**Semester- VII**

- CA-7.1 Design and Analysis of Algorithms
- CA-7.2 Automata Theory and Computability
- CA-7.3 Artificial Intelligence
- CA-7.4 Advanced Java Programming
- CA-7.5 ADBMS
- CA-Lab-13 Lab on Design and Analysis of Algorithms
- CA-Lab-14 Lab on Advanced Java Programming

**Semester- VIII**

- CA-8.1 Software Project Management
- CA-8.2 Internet Computing
- CA-8.3 Network Programming
- CA-8.4 Advanced Computer Graphics
- CA-8.5 Optimization Algorithms
- CA-Lab-15 Lab on Internet Computing & Computer Graphics
- CA-Lab-16 Lab on Network Programming

**Semester- IX**

- CA-9.1 Compiler Construction
- CA-9.2 Cloud Computing
- CA-9.3 Mobile Computing ( Android)
- CA-9.4 Visual C++ (MFC)
- CA-9.5 Natural Language Processing
- CA-Lab-17 Lab on Mobile Computing ( Android)
- CA-Lab-18 Lab on Visual C++

**Semester- X**

- CA-10.1 Full Time Industrial Training

# SEMESTER-I

## CA 1.1 Computer Fundamentals & Office Automation

### **UNIT 1: Introduction to Computer** [6] [10]

Definition of computer, Block Diagram of Computer, Types of computer, Memory: Primary Memory, RAM, ROM, EPROM, PROM, Secondary Memory, Hard Disk, Pen Drive  
Definition: Program, Hardware, Software, Firmware, Interpreter, Compiler

### **UNIT 2: Input & Output Devices** [4] [6]

Input Devices: Keyboard, Mouse, Scanner, Web Camera etc. Output Devices: Monitor, Printer, Plotter etc.

### **UNIT 3: Algorithm and Flowcharts** [5] [6]

Algorithm: Basic notation of algorithm Flowcharts: Definition, Symbols of flow charts  
Examples of algorithms and flowcharts

### **UNIT 4: Concepts of Internet** [8] [14]

What is Computer Network? Types of Networks: LAN, MAN, WAN, History of Internet, Working of Internet, Use of Internet, Applications of Internet, Study of Web Browsers, Search Engines, Creating an E-mail Account, Sending & Receiving E-mail (with attachment)

### **UNIT 5: Operating System** [7] [12]

What is booting, Definition of operating system, functions of operating system, types of operating system, batch operating system, time sharing, multi programming, multi tasking.

### **UNIT 6: Concepts of Software** [8] [12]

Types of software: System Software, Application Software, System Software: Anti Virus, Honey pot system, Application Software: Word Processing, Spreadsheet, Presentation, Programming Languages: High level, Middle Level, Low Level, 4GL

### **UNIT 7: MS-OFFICE:** [12] [15]

Introduction to Ms-office, Components and features.**MS-Word** – Creating letter, table, fonts, page layout document formatting spell check, print preview, template, colour, mail merge, auto text, inserting picture, word art.**MS-EXCEL** –Introduction to Excel, Sorting, Queries, Graphs, Scientific functions. **Power Point** :- Introduction to Power Point Creation of Slides, Inserting pictures, Preparing slide show with animation.**MS-ACCESS** - Creation and Manipulation of Files.

**REFERENCES :**

1. V. Rajaraman, Fundamentals of Computers ,PHI publication.
2. Roger Hunt and John Shelley ,Computers and Commonsense PHI publication
3. Abrham Silberschatz ,Operating System concepts , John Wiley & sons INC
4. A. S.Tananbaum ,Computer Network
5. Microsoft Office 2000 by Vipra Computers, Vipra Printers Pvt. Ltd.

## CA 1.2 Basics of Accounting

**UNIT 1:** [14] [22]

Basics in bookkeeping and accounting –Meaning of bookkeeping and accounting, Purpose of book keeping and Accounting, types of accounting, Basic accounting concepts, principles and conventions.

**UNIT 2:** [10] [15]

Types of accounts, Journal, subdivision of journal, different types of cash books, Ledger, trial balance

**UNIT 3:** [8] [13]

Difference in trial balance, suspense account, rectification of errors.

**UNIT 4:** [10] [15]

Final accounts of sole proprietor, trading account, profit and loss account and balance sheet.

**UNIT 5:** [8] [10]

Bank reconciliation statement.

### REFERENCES :

1. T.S.Grewal & S.C.Gupta , Introduction to Accountancy ,S Chand.
2. Anil Chaowdhary , Fundamentals of Accounting and Financial Analysis ,Pearson Education.
3. Rajesh Agarwal and R. Shriniwasan Accounting made easy — Tata McGraw-Hill
4. Dr. S.N.Maheshwari Fundamentals of Accounting –\_ Vikas Publishing house.

## CA 1.3 Programming Using C

### **UNIT 1: Introduction** [10] [16]

History, Special features and application areas, Structured programming approach & feature types, operators and expressions, variable name, data type and size contents, declaration, arithmetic operators, relational operators, logical operators, Bit wise operators, increment, decrement operators, assignment operators, compound assignment operator, conditional expression, special operators, precedence and order of evaluation.

### **UNIT 2: Input-Output and Control Flow** [8] [16]

Standard Input-output, formatted input and output statements, Control flow: statement and block, if- else- if, switch, break, continue, go to, loops: while, for, do-while, nesting of loops.

### **UNIT 3: Functions and Program Structures** [8] [10]

Basics, function with return value argument (formal arguments, local arguments), recursion-preprocessor, string functions and free ( ).

### **UNIT 4: Pointer and Arrays** [8] [14]

Pointer and address, pointers and function argument, pointer and arrays, address and arithmetic, character pointers and function, multidimensional array, pointer to pointers, initialization of pointer array, command line argument, pointer to function .

### **UNIT 5: Structure, Union, Typedef** [8] [12]

Structure Basics, Pointer to structure, Nested structure, Self referential structure, Field Union, Typedef.

### **UNIT 6: File Handling** [8] [7]

Sequential file handling, File creation and access, miscellaneous functions of file.

### **REFERENCES :**

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill Education, 2008.
2. Yashavant P. Kanetkar, Let us C, BPB Publication.
3. Herbert Sehlidt, The Complete Reference C, Tata McGraw-Hill Publication.

## CA-1.4 Mathematical Foundation

### UNIT - 1: Sets

[8] [10]

Meaning of a Set, Method of Describing a Set, Tabular Form, Set Builder Form, *Types of A Set*: Finite Set, Infinite Set, Equal Sets, Overlapping Sets, Disjoint Sets, Complementary Set. *Operations on Sets*: Union of Sets, Intersection of Sets, Difference of Sets, Demorgan's laws (Without Proof), Venn Diagrams, Cartesian product Of Two Sets

### UNIT - 2: Mathematical Logic

[10] [12]

Meaning of Statement, Primitive and Compound Statements, Truth Values of A Statement, Law of Excluded Middle, Logical Operations: Negation, Conjunction & Disjunction Implication, Double Implication, Equivalence, Equivalence of Logical Statements, Truth Tables & Construction of Truth Tables, Tautology and Contradiction, Argument: Valid and Invalid Arguments

### UNIT - 3: Permutation and Combination

[8] [15]

Meaning of Factorial of a Number, Meaning of Permutation and Combination, Statement of Fundamental Principle Of Counting, Determination of Number of Permutations Of N Objects Taken R Objects At A time ( When All N Objects Are Different), Determination of Number of Combination All N Objects Are Different).

### UNIT - 4: Matrices and Determinants

[12] [20]

Meaning Of A Matrix, Order Of Matrix, Types of Matrix: Zero Matrix, Column Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Symmetric Matrix, Skew-Symmetric Matrix, Transpose of A Matrix: Singular Matrix & Non-Singular Matrix. Algebra of Matrices: Equality of Matrices, Multiplication of Matrix by a Scalar, Addition of Matrices, Subtraction of Matrices, Multiplication of Matrices. Determinants: Meaning of Determinant, Evaluation of Second and Third Order Determinants, Minor, Cofactor of an Element Adjoint of Matrix, Meaning of Inverse of a Matrix, Matrix Inversion by Adjoint Method, Cramer's rule and matrix inversion method to solve system of linear equations in two and three variables.

### UNIT 5: Function

[6] [10]

Meaning of a Function, Methods of Describing A Function, Meaning of Domain, Co-Domain, Image, and Range of A Function. *Types Of A Function*: One-One Function, One Two Functions, Many-One Function, Constant Function, Identity Function, Polynomial Function, Linear Function, Rational Function, Exponential Function, Logarithmic Function, Explicit And Implicit Functions, Even Function, Odd Function, Composite Function.

### UNIT - 6: Coordinate System

[6] [8]

Introduction to Coordinate System, Coordinates of a Point, Quadrants, Plotting the Points, Drawing a Straight Line Passing through Two Given Points, Solving a System of Linear Inequalities in Two Variables Graphically.



**REFERENCES:**

1. Sancheti & Kapoor ,Business Mathematics ,Sultan Chand & Co. New Delhi 2.
2. Anand Sharma ,Business Mathematics & Analytics Himalaya Publishing 3.
3. Dr.Ramnath Dixit and Dr.Jinendra Jain Business Mathematics Himalaya Publishing

## CA 1.5      Essentials of Web Designing

### **UNIT - 1: Internet Basic** **[04] [05]**

Basic concepts, Communicating on the Internet, Internet Domains, Internet Server Identities, Client IP Address, Overview of TCP/IP

### **UNIT - 2: HTML** **[10] [15]**

Introduction to HTML, HTML File creation, Web Server, Web Client / Browser. Basic Concepts of HTML, The <H> Tag, Commonly used HTML Tags, The Text Attributes, Adding Images / Graphics to HTML, List Tag, Types of Lists, Tables, Table Attributes, Table Properties, Links, Images as hyperlinks, Frames

### **UNIT - 3: HTML Forms** **[08] [10]**

Working with HTML Forms, Adding elements to a form, Elements-Label, TextBox, Button, Submit, Reset, CheckBox, Radio, TextArea, Select and Option elements, Hidden Field Element.

### **UNIT - 4: HTML 5** **[06] [10]**

HTML5 Introduction, Basic Tags in HTML5, Images, List and Links in HTML5, Table and Forms in HTML 5, Audio and Video in HTML 5, Canvas

### **UNIT - 5: CSS** **[12] [20]**

Introduction to CSS, Basics of CSS, Selectors, Cascade and Inheritance, Applying Font Faces, Manipulating the display of Text, Background Colors and Images, The Box Model, Floating and Vertical Alignment, Styling Lists, Positioning, Styling Tables, Create a complete Layout. Advanced Selectors, Styling for Print, Customizing the mouse cursor, Controlling Opacity and Visibility, Closing Comment.

### **UNIT - 6: CSS3** **[10] [15]**

Introduction to CSS3, New features in CSS3: rounded borders, box and text shadows, gradient backgrounds, 2D and 3D transformations, transitions, animations, multiple columns.

### **REFERENCES:**

1.     Firuza Aibara , “HTML 5 for Beginners” , Shroff Publishers & Distributors Pvt Ltd – 1<sup>st</sup> Edition 2012
2.     Ian Pouncey & Richard York, “Beginning CSS Cascading Style Sheets for Web Design” –Wiley India Pvt. Ltd. 3<sup>rd</sup> Edition
3.     E. Stephen Mack Janan Platt, “HTML 4.0” , BPB Publication – 1<sup>st</sup> Edition
4.     Ivan Bayross ,“Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP” , BPB Publication – 4<sup>th</sup> Edition.
5.     Joseph W. Lowery, Mark Fletcher ,HTML 5 24-Hours Trainer , Wiley India Pvt. Ltd.

## CA Lab -1 Lab on Programming using C

1. Write a program in C to find the compound and simple interest.
2. Write a program in C to check the number is palindrome or not.
3. Write a program in C to root of quadratic equation.
4. Write a program in C for Fibonacci series upto given term.
5. Write a program in C to generate all prime numbers in the given range.
6. Read given number in word (Ex: - 937 – Nine hundred Thirty Seven).
7. Write a program in C to find factorial of given number.
8. Write a program in C for matrix multiplication
9. Write a program in C for Matrix Transpose.
10. Write a program in C Concatenate two strings
11. Write a program in C Count the number of words in inputted sentence.
12. Write a program in C to store the names of 10 students, and marks of 3 subjects by each student in 2D array using pointer, sort the above array and display the merit list.
13. Write a program in C to create a file (use structure) with following structure:-  
Name 25 characters.  
Gross pay 05 digits.

## CA Lab -2 Lab on Essentials of Web Designing

1. Create a HTML document to display “Hello World” to demonstrate File creation & HTML Form structure.
2. Create a HTML document to demonstrate Use of The <H> Tag(h1 to h6).
3. Create a HTML document to demonstrate commonly used HTML Tags.
4. Create a HTML document to demonstrate The Text Attributes.
5. Create a HTML document to demonstrate Adding Images / Graphics to HTML.
6. Create a HTML document to demonstrate Lists (all), Links, Images as hyperlinks, Frames.
7. Create a HTML document to demonstrate Tables, Table Attributes, Table Properties.
8. Create a HTML document to demonstrate HTML form using Elements-Label, TextBox, Button, Submit, Reset, CheckBox, Radio, TextArea, Select and Option elements, Hidden Field Element in Table Tag.
9. Create a HTML document to demonstrate Basic Tags in HTML5.
10. Create a HTML document to demonstrate Images, List and Links in HTML5.
11. Create a HTML document to demonstrate Table and Forms in HTML 5.
12. Create a HTML document to demonstrate Audio and Video in HTML 5.
13. Create a HTML document to demonstrate HTML5 Canvas.
14. Create a HTML document with HTML tags and apply CSS for Font Faces, Manipulating the display of Text, Background Colors and Images.
15. Create a HTML document with HTML & HTML5 tags and apply CSS to demonstrate The Box Model, Floating and Vertical Alignment, Styling Lists, Positioning appropriately.
16. Create a HTML document with HTML & HTML5 table & Form tag with all form elements and apply CSS for Styling Tables & Form elements.
17. Create a HTML document with HTML & HTML5 tags and apply CSS to demonstrate Advanced Selectors, Styling for Print.
18. Create a HTML document with HTML & HTML5 tags and apply CSS to demonstrate Customizing the mouse cursor, Controlling Opacity and Visibility, Closing Comment.
19. Create a HTML document with HTML & HTML5 tags and apply CSS to demonstrate styling Properties of CSS3 as-rounded borders, box and text shadows, and gradient backgrounds.
20. Create a HTML document with HTML & HTML5 tags and apply CSS to demonstrate styling Properties of CSS3 as-2D and 3D transformations, transitions.
21. Create a HTML document with HTML & HTML5 tags and apply CSS to demonstrate styling Properties of CSS3 as-animations, multiple columns.
22. Create a HTML document to demonstrate any Form(e.g. Student Admission, Student Examination, Student Registration) using HTML & HTML5 tags and apply Proper Styling attributes using CSS & CSS3.

## SEMESTER-II

### CA 2.1 Linux Operating System

**UNIT – 1 History and Development of Linux:** [5] [7]

A Brief History of Linux, Benefits of Linux, Acquiring and Using Linux, Examining Linux Distributions, Logging In and Using the Linux System, Linux Commands, Logging in and Using Remote Linux Systems.

**UNIT – 2 User Accounts:** [3] [5]

Creating Additional User Accounts, Creating & Managing Groups, Managing Users.

**UNIT – 3 Introduction to the File system& Linux Permissions:** [8] [15]

File system Navigation, Managing the File system, Performing File system Maintenance and Locating Files. Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, Setting Daemon and Process Permissions, Evaluating System Security.

**UNIT – 4 Advance File Subsystem:** [8] [10]

Internal representation of files: Inodes – Structure of a regular file (algorithm: bmap)– Directories – Conversion of a path name to an Inode (algorithm: namei) – Super block – Inode assignment to a new file (algorithm: ialloc) – Allocation of disk blocks.

**UNIT – 5 Creating and Viewing Files & Archiving Files:** [8] [12]

Using the vi Editor, Using Other Editors, Examining File Contents, Redirection. Archiving Files with tar, Archiving Files with *cpio*, Archiving Files with Other Utilities, Zipping Files, Examining Backup Issues.

**UNIT – 6 Working in X Windows:** [8] [12]

Introduction to X Windows and GNOME, Managing Files and File systems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.

**UNIT – 7 Printing Files:** [4] [5]

Configuring a Local Printer, Printing, Managing Print Spools and Queues, Configuring Remote Printers.

**UNIT – 8 Package Management & Configuring the Linux Environment:** [6] [9]

Examining Package Solutions, Managing Packages with RPM, Verifying and Repairing Applications, Upgrading and Freshening Packages. Examining Shells, Using Variables, Examining Linux Configuration Script Files, Examining System Startup Files, Examining the /etc/fstab File, Examining the cron System, Creating a Shell Scripts.

## **REFERENCES:**

1. E. Nemeth, G. Snyder, T. Hein, *Linux Administration Handbook*, Pearson Education, 2009.
2. McCallister, *Suse Linux-10*, Pearson Education, 2006.
3. Ball, *Using Linux*, PHI, 1998.
4. Das, *Unix: Concepts and Applications (4th Ed)*, TMH, 2006.
5. Foster Johnson, Welch, Anderson, *Beginning Shell Scripting*, Wiley India (Wrox), 2006.
6. Neil Mathew, Richard Stones, *Beginning Linux Programming (3rd Ed)*, Wiley India (Wrox), 2006.
7. Peterson, *Linux: Complete Reference (5th Ed)*, TMH.
8. Maurice J. Bach, *The Design of the Unix Operating System*, Pearson Education.

## CA-2.2 Discrete Mathematics

**UNIT – 1 Mathematical Logic:** [8] [10]

Connectives, Normal Forms, Predicate Calculus, Inference Theory of the Predicate Calculus

**UNIT - 2 Algebraic Structures:** [8] [15]

Groups, Semigroup, Subsemigroup, Free Semigroup, Congruence Relation, Group, Subgroup, Abelian Group, Group Codes.

**UNIT – 3 Relations:** [8] [10]

Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

**UNIT – 4 Graphs:** [10] [15]

Introduction to Graphs and Graph Models, Terminology and Special Types of Graphs, Representations of Graphs, Isomorphism, Connectivity, Euler and Hamiltonian Paths - Shortest Path problems- Planar Graphs- Graph Coloring.

**UNIT – 5 Trees:** [8] [15]

Introduction to Trees, Applications of Trees, Traversals, Spanning Trees, Minimum Spanning Trees.

**UNIT - 6 Storage Representation and Manipulation of Graphs:** [8] [10]

Trees, List Structures and Graphs, PERT and Related Techniques

**REFERENCES:**

1. Kenneth. H. Rosen ,Discrete Mathematics and its Applications, Sixth Edition Tata McGraw-Hill Publishing Company, New Delhi.
2. Joe L. Mott, Abraham Kandel ,T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, Third Edition , Prentice Hall of India Ltd, New Delhi.
3. Tremblay, Discrete Mathematics

## CA 2.3 System Programming

### **UNIT - 1 Introduction to System Programming:** [3] [5]

Types of Softwares, Components of System Software, Comparison of System and Application Software

### **UNIT - 2 Assembly Language Programming:** [6] [10]

Introduction to Assembly Language Programming - Introduction to Instruction Formats, Data formats - Role of Base Register, Index Register

### **UNIT - 3 Assembler:** [10] [15]

Introduction to Assembler, Databases used in Assembler Design, Design of Assembler - Single Pass & Double Pass.

### **UNIT - 4 Macro Processor:** [10] [15]

Introduction to Macros, Various types of Macros, Design of Macro Processor - Single Pass & Double Pass.

### **UNIT - 5 Loaders:** [6] [10]

Introduction to Loaders, Functions of a Loader, Types of Loaders, Databases used in Loaders, Design of Loaders - Absolute & DLL.

### **UNIT - 6 Grammars:** [3] [5]

Introduction to grammars, Languages, Finite State Machines

### **UNIT -7 Compilers:** [8] [10]

Introduction to compilers: Brief discussion on various Phases of Compilers. Applications of FSM and Grammars in compiler design

### **UNIT - 8 Software Tools:** [4] [5]

Introduction to Software Tools, Text Editors, Interpreters, Program Generators, Debug Monitors.

### **REFERENCES:**

1. Dhamdhare D.M., System Programming, (IInd Revised Edition), Tata McGraw Hill
2. Donovan, Systems Programming, Tata McGraw Hill
3. Leland. L. Beck, System Software, Pearson Education.
4. Adam Hoover, System Programming with C and Unix, Pearson Education, 2010



## **CA 2.4 Object Oriented Analysis & Design**

### **UNIT 1: Introduction to OOAD [6] [10]**

What is OOAD? Class and Objects, Object State and Properties Introduction, Object Oriented Development, Models- Static and Dynamic Models.

### **UNIT 2: Review of Object Orientation [6] [12]**

Objects, Classes, Links and Associations, Generalization and Inheritance, Aggregation, Generalization.

### **UNIT 3: Object Modeling Technique [10] [15]**

Rumbaugh, Booch, Jacobson Methods, Patterns, Frameworks, Documentation.

### **UNIT 4: UML [10] [15]**

Identifying Use Case, System Sequence Diagrams, Use Case, UML Package Diagram, UML Interaction Diagrams.

### **UNIT 5: Object Oriented Analysis [10] [15]**

Dynamic Modeling, Events and States, Operations, Nested State Diagram, Functional Modeling, Data Flow Diagram.

### **UNIT 6: Object Oriented Design [8] [10]**

Design Process, Axioms, Colollaries, Coupling, Cohesion, Designing Classes, Designing Interface Objects – Macro and Micro Level Processes.

### **REFERENCES :**

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.
2. Booch, Jacobson, Rumbaugh, "Object Oriented Analysis and Design with Applications", Third Ed., Pearson Education, 2010.

## CA 2.5 Programming Using C++

### **UNIT 1: Introduction:** [5] [5]

Object-oriented programming, Need Object-Oriented Programming, Characteristics of Object-Oriented Languages, Difference C++ and C.

### **UNIT 2: Object and Classes:** [10] [15]

Making sense of core object concepts (Encapsulation Abstraction, Polymorphism, Classes, Messages Association) Implementation of Class in C++, C++ Objects as Physical Object, C++ Object as Data Types Constructor, Object as Function Arguments, The Default Copy Constructor, Returning Object From Function, Structures and Classes, Classes Objects and Memory Static Class Data, Const Data Const and Classes. Arrays as Class Member Data, Arrays Of Object

### **UNIT 3: Inheritance:** [8] [15]

Concept of Inheritance, Derived Class And Base Class, Derived Class Constructors, Overriding Member Function, Class Hierarchies, Public And Private Inheritance, Levels Of Inheritance, Multiple Inheritance, Ambiguity In Multiply Inheritance, Aggregation: Classes Within Classes, Inheritance And program Development.

### **UNIT 4: Operator Overloading:** [8] [10]

Overloading Unary Operators, Overloading Binary Operators, Data Conversion. Pitfalls of Operators Overloading and Conversion, Keywords Explicit and Mutable.

### **UNIT 5: Virtual Function:** [8] [10]

Virtual Function , Friend Function, Static Function, Assignment and Copy Initialization, This Pointer, Dynamic Type Information.

### **UNIT 6: Templates And Exceptions:** [5] [10]

Function Templates, Class Templates Exceptions.

### **UNIT 7: The Standard Template Library:** [6] [10]

Introduction Algorithms, Sequence Containers, Iterators, Specialized Iterators, Associative Containers, Storing User- Defined Object, Function Objects.

### **References books:**

1. A. N. Kamthane, Object Oriented Programming with ANSI and Turbo C++, Pearson Education, 2009.
2. Robert Lafore, Object Oriented Programming in-C++ , Techmedia Publication.
3. Herbert Sehlidt ,The Complete Reference C++ ,Tata Megraw-hill publication.
4. Saurav Sahay , Object Oriented Programming in C++ Oxford University Press.
5. Cay Horstmann ,OOPS C++ Big C++ ,Wiley Publication.

## CA Lab -3      Lab on Linux Operating System

**Instructor should ask students to give live demonstrations on:**

- 1. System Access:** Logging In, Linux Commands, Getting Help, Obtaining Information about Your System, Logging In and Using Remote Linux Systems.
- 2. Starting and Stopping Linux:** Shutting Down a Linux System, Booting a Linux System, Other Boot Methods.
- 3. User Accounts:** Creating Additional User Accounts, Groups, Managing Users and Groups.
- 4. File system:** File system Navigation, Managing the File system, Performing File system Maintenance, Locating Files.
- 5. Working with Linux Permissions:** Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, Setting Daemon and Process Permissions, Evaluating System Security.
- 6. Creating and Viewing Files:** Using the *vi* Editor, Using Other Editors, Examining File Contents Redirection.
- 7. Archiving Files:** Archiving Files with tar, Archiving Files with cpio, Archiving Files with Other Utilities, Zipping Files, Examining Backup Issues.
- 8. Shell Scripts:** Creating a Shell Scripts (Create at least ten shell scripts).
- 9. Working in X Windows:** Managing Files and File systems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.
- 10. Printing Files:** Configuring a Local Printer, Printing, Managing Print Spools and Queues Configuring Remote Printers.
- 11. Configuring the Linux Environment:** Examining Shells, Using Variables, Examining Linux Configuration Script Files, Examining System Startup Files, Examining the */etc/fstab* File, Examining the cron System,
- 12. Multitasking:** Managing Jobs and Background Processes, Using the Process Table to Manage Processes, Delayed and Detached Jobs.

## **CA Lab - 4      Lab on Programming Using C++**

1. Write a program to demonstrate encapsulation using of class.
2. Write a program to demonstrate use constructor.
3. Write a program to demonstrate use copy constructor.
4. Write a program to demonstrate use parameterized constructor.
5. Write a program to demonstrate use of destructor.
6. Write a program to demonstrate constructor overloading.
7. Write a program to demonstrate multiple inheritance
8. Write a program to demonstrate inheritance.
9. Write a program to demonstrate use of function overloading.
10. Write a program to demonstrate use of operator overloading.
11. Write a program to demonstrate use of friend class.
12. Write a program to demonstrate use of friend function.
13. Write a program to demonstrate use of recursive function.
14. Write a program to demonstrate use of array of objects.
15. Write a program to demonstrate use of function templates.
16. Write a program to demonstrate use of class templates.

## **SEMESTER-III**

### **CA 3.1 System Analysis and Design**

**UNIT-1 System Concept and Information [8] [15]**

System Environment, The system concepts, Characteristics of system, Elements of System, General Business Knowledge, Problem Solving Skills

**UNIT-2 System Development Life Cycle [12] [15]**

Recognition of Need, Problem Definition, Feasibility Study, Analysis, Design, Implementation, Post Implementation and Maintenance, Factors affecting the system , SDLC Models –Waterfall, Spiral & RAD

**UNIT-3 System Planning and Initial Investigation [20] [25]**

Strategies for Determining Information Requirement, Definition and Project Initiation Background Analysis, Fact Analysis, Review of Written Documents, Onsite observations, Interview and Questionnaires, Efficiency Analysis, Service Analysis, Tools for Structured Analysis, Data Flow Diagram (DFD), ERD, Data Dictionary, Decision Tree and Structured English, Decision Tables, Pros and cons of Each tool

**UNIT-4 Brief Introduction to Coding, Testing, Implementation & Maintenance [6] [10]**

**UNIT-5 Introduction to CASE tool [4] [10]**

**REFERENCES :**

1. Pressman, R. (1987). Software Engineering: A Practitioner's Approach, 2d ed. New York, NY: McGraw-Hill.
2. STRUCTURED SYSTEM ANALYSIS AND DESIGN,ISRD Group ISBN: 9780070612044

## **CA 3.2 Database Management System (DBMS)**

### **UNIT – 1 Introductory Concepts [6] [5]**

Databases Concepts, Database Users, and Database architecture.

### **UNIT – 2 E-R Diagram Concepts [6] [5]**

ER Modeling concepts, ER Diagrams, Cardinality constraints, Higher-order relationships, Weak-entity types, Subclasses and inheritance, Specialization and Generalization,

### **UNIT – 3 Relational Model [6] [13]**

Relational algebra, Relational model concepts, Relational integrity constraints, Update operations on relations, Relational algebra model, ER to relational mapping.

### **UNIT – 4 Structures Query Language [7] [10]**

Data definition in SQL, Queries and update statements, Views, Integrity constraints.

### **UNIT – 5 Functional Dependency and Normal Forms [7] [15]**

Functional dependencies: Keys in a relational model, Concept of functional dependencies, First Normal Form, Second Normal Form.

### **UNIT – 6 Transactions [8] [12]**

Transaction Fundamentals, OLTP environments, Concurrency issues, need for transactions, Necessary properties of transactions (ACID properties), Transaction states,

### **UNIT – 7 Concurrency Control [10] [15]**

Two-phase locking (2PL) protocol, Timestamp-ordering based protocol, Deadlock prevention protocols, Wait-die and wound-wait schemes, Deadlock recovery.

### **REFERENCES :**

1. Elmasri, Navathe. Fundamentals of Database Systems (Third Edition), Pearson Education, 2004.
2. J. Ullman, Principles of Database Systems, GALGOTIA Publications, 2010.
3. S. K. Singh, Database Systems: Concepts, Design and Applications, Pearson Education, 2006.
4. Silberschatz, Korth and Sudarshan , Database System Concepts

## CA 3.3 : Data Structures

### UNIT - 1 Introduction to Data Structure [8] [10]

Concepts, Data types, ADT (Abstract Data Type), Types of data structure, Algorithm Analysis: Space complexity, Time complexity, Asymptotic Notations (Big O, Omega, Theta), Linear data structure : Array as linear data structure, Representation of array in memory, Strings as ADT, structure and pointer in C/C++.

### UNIT - 2 Linked List and queues [9] [15]

Linked list: Introduction, Types – Singly, doubly, singly circular, doubly circular, Dynamic representation, Operations on linked list Queues: Introduction, Representation: static and dynamic, Operations on queue, Circular queue, priority queue.

### UNIT – 3 Stack [4] [10]

Introduction, Representation : static and dynamic, Operations on stack, Applications- Infix to Postfix, Evaluation of Postfix expression.

### UNIT – 4 Tree [10] [15]

Concept & terminologies, Binary tree - Representation: static and dynamic, Types: full, complete, skewed. Traversal: inorder, preorder, postorder. Binary Search Tree - Concept & Operations: create, insert, delete. Height balanced tree – AVL tree, Application - Heap Sort, Expression tree

### UNIT - 5 Graph [8] [10]

Concept & terminologies, Representation: Adjacency matrix, Adjacency list. Traversal: DFS, BFS, Spanning tree, minimum spanning tree, Prim's Algorithm.

### UNIT - 6 Hashing [3] [5]

Hash table concepts, Hash functions, Overflow handling techniques

### UNIT - 7 Sorting and searching [8] [10]

Sorting: General Background, bubble sort, Selection sort, Insertion Sorts, Quick sort, Merge and Radix Sorts. Searching: Linear and Binary search.

### REFERENCES :

1. Horowitz, Sahni, Mehta, Fundamentals of Data Structures in C++, Universities Press.
2. Tenenbaum, Langsam, Augenstein, Data Structures using 'C', Pearson Education.
3. Bala Guruswamy, Data Structures Using 'C' TMH
4. Weiss, Data Structures Using 'C', Pearson Education

## **CA 3.4 Computer Networks**

### **UNIT 1: Introduction to Computer Networks & Types [6][10]**

Introduction to Computer Networks, Advantages of Networks, Point-Point & Broadcast Links Network Classification: LAN, MAN, WAN, Wireless Networks, Transmission Path: Twisted Pair, Coaxial Cable, Fiber Optics

### **UNIT 2: Topologies & Switching [8][10]**

Topologies: Star, Tree, Bus, Ring, Mesh, Fully Connected. Switching: Circuit Switching, Message Switching, Packet Switching.

### **UNIT 3: Reference Model [6][10]**

ISO OSI Reference Models, TCP / IP Reference Model & their Comparison.

### **UNIT 4: Data Link Control [10][15]**

Services Provided to Network Layer, Framing, Error Control, Flow Control, Error Correction – Redundancy, Parity Check, Checksum & CRC, Error Detection – Hamming Code.

### **UNIT 5: Elementary Data Link Protocol & Sliding Window Protocol [10][15]**

An Unrestricted Simplex Protocol, Stop & Wait protocol, One bit Sliding Window Protocol, A Protocol using Go Back N.

### **UNIT 6: Network Security [10][15]**

Cryptography – Substitution Ciphers & Transposition Ciphers, Firewall, Digital Signatures – Public Key Signature & Symmetric Key

### **REFERENCES :**

1. Andrew S.Tanenbaum Computer Networks – Fourth Edition
2. Behrouz A. Forouzan, Data Communication & Networking – Third Edition
3. William A Shay, Understanding Data Communications and Networks, 2nd Edition, Vikas Publishing House



## CA 3.5: Operating System

### UNIT - 1: Introduction to OS: [6][10]

What is an Operating System? What are the components of an OS? Different types of OS. What is System Call?

### UNIT - 2: Processes: [8][15]

Process Concept, Process Scheduling, Operations on Processes, Thread, Types of Thread, Multithreading Models

### UNIT - 3: CPU Scheduling: [8][10]

Basic Concepts, Scheduling Criteria, Scheduling Algorithms, FCFS, SJF, Priority, Round Robin, Multiple-Processor Scheduling, Algorithm Evaluation.

### UNIT - 4: Deadlocks: [10][15]

Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

### UNIT - 5: Memory Management: [12][15]

Address Binding - Linking and Loading, Swapping, Contiguous Allocation Paging, Segmentation, Demand Paging, Process Creation, Page Replacement - FIFO, OPT, LRU, Allocation of Frames

### UNIT - 6: Virtual Memory: [6][10]

Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing.

### REFERENCES:

1. Nutt, Chaki, Neogy, Operating Systems, Pearson Education, Third Ed., 2009.
2. Peterson Silberschats, Operating System Concepts, Addition Wesley Publication.
3. Achut Godbole, Operating System, TMH.
4. Andrew s. Tenenbaum, A.S. Woodhill, Operating Systems Design & Implementation, Pearson Education.

## **CA Lab -5 LAB on DBMS**

1. Assignment on DDL Commands
2. Assignment on DML Commands
3. Assignment on various types of Constraints.
4. Assignment on select clause, where clause, Ordered By, Distinct, Group By etc.
5. Assignment on Aggregate Functions.
6. Assignment on String functions.
7. Assignment on Date and Time Functions.
8. Assignment on Union, Intersection and Set difference.
9. Assignment on Nested Queries.
10. Assignment on Views.

## **CA Lab -6 Lab on Data Structures**

1. Implementation of Stacks, Queues (Static and dynamic), types of queue.
2. Applications of Stack : Infix to Postfix Conversion, evaluation of postfix expression.
3. Polynomial arithmetic using linked list.
4. Implementation of Linear and Binary Search .
5. Implementation of bubble sort, Selection sort, Insertion Sorts, Quick sort, Merge Radix Sorts, and Heap sort.
6. Implementation of Binary Tree and Traversals on Binary Trees.
7. Implementation of Binary search Tree.
8. Implementation of operations on AVL Trees.
9. Implementation of graph Traversal and Prim's algorithm.

## **SEMESTER-IV**

### **CA 4.1 E--Commerce**

#### **UNIT 1 : Introduction to E-Commerce [8][10]**

Definition and scope of E-Commerce and M-Commerce, E-Commerce trade cycle, Electronic Markets, Internet Commerce, Benefits and Impacts of E-Commerce.

#### **UNIT 2 : Elements of E-Commerce**

**[6][10]**

Various elements, e-visibility, e-shops, Delivery of goods and services, Online payments, After - sales services, Internet E-Commerce security.

#### **UNIT 3 : EDI and Electronic Payment Systems [10][15]**

Introduction and definition of EDI, EDI layered Architecture, EDI technology and standards, EDI communications and transactions, Benefits and applications of EDI with example, Electronic Payment Systems: credit/debit/smart cards, e-credit accounts, e-money.

#### **UNIT 4 : Introduction to EC models [10][15]**

Inter-organization and intra-organization E-Commerce, E-Commerce Models: B2B, B2C, C2B, C2C, G2C, C2G.

#### **UNIT 5 : E-Business [8][10]**

Introduction to Internet bookshops, Grocery Suppliers, Software Supplies and support, Electronic newspapers, Virtual auctions, Online share dealing, e-diversity.

#### **UNIT 6 : E-Security and Legal Issues [8][15]**

Security concerns in E-Commerce, Privacy, integrity, authenticity, non-repudiation, confidentiality, SSL, Digital Signatures and fire walls, IT Act 2000, Cyber crimes and cyber laws.

#### **REFERENCES :**

1. Gary Schneider, Electronic Commerce, Thomson Publishing.
2. Pandey, Srivastava and Shukla, E-Commerce and its Application, S. Chand
3. P.T. Joseph, Electronic Commerce – An Indian Perspective, P.H.I
4. Bharat Bhaskar, Electronic Commerce, TMH
5. Turban, King, Viehland & Lee, Electronic Commerce- A Managerial Perspective, Pearson.
6. Ravi kalakota & A.B. Whinston, Electronic Commerce- A Manager's Guide, Pearson.
7. Laudon & Traver, e-commerce – Business, Technology, Society. Pearson

## CA 4.2 – Java Programming

### UNIT 1: Introduction To Java

[6][10]

Java as Programming Tool, Advantages of Java - Simple, Object Oriented, Distributed, Robust, Secure, Architecture Neutral, Portable, Interpreted, High Performance, Multithreading, Dynamic.

### UNIT 2: Fundamental Programming

[10][10]

Data Type - Integer, Floating Point, Character, Boolean, Casting of Data Types, Variables- Declaration Rules, Initialization, Assignment, Array- Assignments, Initialization, Operators, A Simple Java Program- Compiling and Running Java Program, Command Line Arguments.

### UNIT 3: Objects And Classes

[10][15]

Introduction - Classes, Objects, Data members, methods, Use of existing Classes, Constructor & Destructor, Static fields & methods ,Method overloading, Packages, Cosmic Super class “OBJECT”.

### UNIT 4: Functions In Java

[10][15]

String functions - Concatenation, Substring, String editing, Testing for Equality, character extraction function – CharAt, getChars, getByte ,Formatting functions, Date and Time functions using Gregorian Calendar Class.

### UNIT 5: Inheritance & Interfaces

[8][15]

Inheritance, Inheritance Hierarchy, Super class, Method Overriding, Polymorphism, Access modifier, Wrapper classes, Reflection - 'Class' class, Interfaces, Inner classes, Interface concept & applications.

### UNIT 6: Applets Programming

[6][10]

What is an Applet, Applet lifecycle, applet class, passing parameters to applet, Use of java.awt. graphics class and its various methods in an applet.

### REFERENCES :

1. Cay's Horstmann and Gary Cornell. Core Java Volume -1 Fundamentals
2. Herbert Schildt ,The complete reference JAVA-2 Fifth Edition ,TMH
3. E Balguruswamy ,Programming in Java

## CA 4.3–Management Information System

### **UNIT 1 Introduction:** [6][10]

Definition, Purpose, Objectives and Role of MIS in Business Organization with particular reference to Management Levels. MIS Growth and Development,

### **UNIT 2 MIS in the Organization :** [8][10]

concept and design. Transaction Processing System, Decision Support System, Executive Information system, Expert System, and the recent developments in the field of MIS.

### **UNIT 3 System Development:** [8][15]

Concept of System, Types of Systems – Open, Closed, Deterministic, Probabilistic, etc. Relevance of choice of System in MIS, Integration of Organization Systems and Information Systems,

### **UNIT 4 System Development Life Cycle:** [8][10]

System Analysis, Design and Implementation, MIS Applications in Business.

### **UNIT 5 Information Concepts:** [10][15]

Data and Information – meaning and importance, Relevance of Information in Decision Making, Sources and Types of Information, Cost Benefit Analysis – Quantitative and Qualitative Aspects, Assessing Information needs of the Organization.

### **UNIT 6 Information Technology:** [10][15]

Multimedia Approach to Information Processing. Decision of Appropriate Information Technology for proper MIS. Choice of appropriate IT Systems – Database, Data warehousing & Datamining Concepts, Centralised and Distributed Processing.

### **REFERENCES :**

1. Javadekar, W.S.“*Management Information System*”, Tata MacGraw Hill Publication, 2003.
2. Davis,B.Gordon, “*Management Information System*”, Tata MacGraw Hill Publication, 2002.
3. Gupta,A.K, “*Management Information System*”,*S Chand Puplications*,2003.
4. Arora,Ashok & Bhatia,Akshaya, “*Management Information System*”, Excel Books,New Delhi, 2001.
5. Basandra,Suresh K., “*Management Information System*”, Wheeler Publishing,New Delhi, 999.
6. O’Brien, James A., “*Management Information System*”, Tata McGraw Hill, 2003.

## CA-4.4 VB.NET

### **UNIT – 1 .NET Framework: [06] [08]**

Introduction, CLR, CTS, MSIL, Garbage Collection, Assemblies, Assembly content, Assembly types

### **UNIT – 2 VB .Net Programming: [22] [30]**

**Windows Forms:** Setting Title Bar Text, Seeing the initial position of a form, Minimizing/Maximising a form, Working with multiple forms, Setting the StartUp Form, Adding controls to a form, Setting properties at Design Time Docking & Anchoring controls ,Setting properties at run time, Creating a Message Box- Using MsgBox Function - Using MessageBox. Show Function, Creating an Input Box, Multiple Document Interface (MDI) Forms, Creating MDI Applications, Creating a Dialog Box. **Handling Events Controls:** Label Control, TextBox Control, Button Control, ComboBox Control, ListBox Control, CheckBox Control, RadioButton, GroupBox Control Panel, PictureBox, ProgressBar & Timer Controls, Menus,Built-in Dialog Boxes, Treeview Controls **Mouse Events & Keyboard Events:**Mouse Events, MouseClick, MouseDoubleClick, MouseDown, MouseEnte, - MouseHover, MouseLeave, MouseMove, MouseUp, Keyboard Events, Key Press, KeyDown, KeyUp

### **UNIT – 3 Object Oriented Programming in VB.NET: [12] [20]**

Class and Object, Properties, methods and events. Constructors and Destructors, Method overloading Inheritance, Access modifiers: Public, Private, Protected, Friend. Overloading and Overriding. Interfaces. Polymorphism, Exception Handling, Importance of Exception Handling, Exception Handling in VB.NET, User defined exception.

### **UNIT – 4 Databases in VB .NET: [10] [17]**

Database : Connections, Data adapters, and datasets, Connection to database with server explorer Data binding with controls like Text Boxes, List Boxes, Data grid etc., Navigating data source Data form wizard, Data validation, Connection Objects, Command Objects, Data Adapters, DataSet Class

### **REFERENCES:**

1. VB.NET Complete Reference-Tata Mac Graw Hill
2. Francisco Balena Programming Microsoft VB.NET
3. Fteven Holzner ,VB.NET in 21 days
4. Jeffery\_R\_Shapiro, Complete reference VB.NET

## CA 4.5 Computer Organization & Architecture

### **UNIT-1 Introduction to Computers** [6] [5]

Basic of Computer, Von Neumann Architecture, Generation of Computer, Classification of Computers, Instruction Execution

### **UNIT-2 Register Transfer and Micro operations** [6] [10]

Register Transfer, Bus and Memory Transfers, Tree-State Bus Buffers, Memory Transfer, Micro-Operations, Register Transfer Micro-Operations, Arithmetic Micro-Operations.

### **UNIT-3 Computer Arithmetic** [6] [15]

Addition and Subtraction With Signed-Magnitude, Multiplication Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithm.

### **UNIT-4 Programming the Basic Computer** [7] [10]

Machine language, Assembly language, Assembler, First pass, Second pass, Programming Arithmetic and Logic operations, Multiplication Program.

### **UNIT- 5 Organization of a Computer** [7] [15]

Central Processing Unit (CPU), Stack Organization, Register Stack, Memory Stack, Instruction Formats, Three- Address Instructions, Two – Address Instructions, One-Address Instructions, Zero-Address Instructions.

### **UNIT- 6 Input-Output Organization** [8] [10]

Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPU-IOP Communication.

### **UNIT -7 Memory Organization** [10] [10]

Memory Hierarchy, Main Memory, Auxiliary Memory, Cache Memory, Virtual Memory, Associative Memory.

### **REFERENCES :**

1. John. P. Hayes ,“Computer System Architecture”.
2. Hwang K. Briggs, “Computer Architecture and parallel Processing “
3. M.Morris Mano ,“Computer System Architecture”.



## **CA Lab -7 Lab on Java Programming**

1. Write a program that demonstrates program structure of java.
2. Write a Java Program that will display Factorial of the given number.
3. Write a Java Program that will display 25 Prime nos.
4. Write a Java Program that will accept command-line arguments and display the same.
5. Write a Java Program to sort the elements of an array in ascending order.
6. Write a Java Program which will read a text and count all occurrences of a particular word.
7. Write a java program which demonstrates the application of constructors.
8. Write a java program which demonstrates the use of methods overloading.
9. Write a java program which demonstrates the use of static members.
10. Write a java program which demonstrates the use of package.
11. Write a java program which explains the concept of single inheritance.
12. Write a java program which demonstrates the method overriding.
13. Write a java program to implement an interface
14. Write a java program to draw a Human Face using Applet.

## CA Lab-8 Lab on VB. NET

1. Develop a program to produce grade sheet using console.
2. Develop a program to check given number is prime or not using console.
3. Develop a program to print Fibonacci series using console.
4. Develop a program to check given number is palindrome or not using console.
5. Develop a program to factorial of a number using function using console.
6. Create form to demonstrate use of methods and properties of array.
7. Develop a program using class & objects.
8. Display message using Textbox, Label and Button Control.
9. Implement simple textpad to perform undo, redo, cut, copy, paste, select all, find, replace, load file, save file operations using richtextbox.
10. Create employee registration form to collect details (using radio button, checkbox and other controls).
11. Create form to select hobbies and nationality using checkbox and radio button.
12. Create a form to demonstrate use of methods and properties of listbox.
13. Create a form to demonstrate use of methods and properties of combobox.
14. Implement canteen order form to take order from customer (using listbox and combobox)
15. Create a form to change the height and width of label using trackbar.
16. Implement colour palate to change the backcolor and forecolor of textbox using scrollbar.
17. Create form to demonstrate use of methods and properties of treeview. Create form to demonstrate use of methods and properties of Listview.
18. Create MDI application having file menu (New, Open, Save, Print, Close) and Format menu (Font, Forecolor, Backcolor).
19. Create form to demonstrate use of structured exception handling
20. Create Form to demonstrate Data Adapters & Data Sets using data binding for controls.
21. Create Calculator using controls.

# SEMESTER-V

## CA 5.1 Web User Interface Designing

### Java Script

#### UNIT 1

[06] [05 ]

**Introduction to Java Script** : Java Script Implementations - ECMA Script, Document Object Model (DOM), The Browser Object Model (BOM), Java Script in HTML, The <script> Elements, Inline code versus External Files, Document Modes, The <noscript> Element

**Language Basics** : Syntax – Case Sensitivity, Identifiers, Comments, variables, Data Types, Operators, Keywords and Reserved Words, Strict Mode, Statements, Conditional Statements, Lopping Statements, Functions & Arguments.

**Variables, Scope, and Memory** : Primitive and Reference Values, Execution Context and Scope, Garbage Collection, Reference Types : The Object Type, Array Type, The Date Type, RegExp Type, Function Type, Wrapper Types, Singleton Built-In Object.

**Object –Oriented Programming** : Understanding Objects, Object Creation, Inheritance

#### UNIT 2

[08] [10]

**The Brower Object Model** : The Window Object, The location Object, The Navigator Object, The Screen Object, The History Object.

**Client Detection:** Capability Detection, Quirks Detection, User-Agent Detection.

**The Document Objet Model** : Hierarchy of Nodes, Working with the DOM, DOM Extensions : Selectors API, Element Traversal, HTML5, Proprietary Extensions, DOM Level 2 and 3 : DOM Changes, Styles, Traversals, Ranges.

#### UNIT 3

[06] [10]

**Events** : Event Flow, Event Handlers, The Event Object, Event Types, Memory and Performance, Simulating Events.

**Scripting Forms** : Form Basics, Script Text Boxes, Scripting Select Boxes, Form Serialization, Rich Text Editing.

## jQuery

### UNIT 4

[04] [05]

**Introduction to jQuery:** The basics of jQuery Programming, A working subset of Selectors, Methods and Event Models, How to use effects and Animations: How to use effects? A slide show application with effects, How to use animation.

### UNIT 5

[06] [10]

**Working with forms and data validation :**Introduction to forms and controls, How to use jQuery to work with the forms? A validation application that uses JavaScript.

**Create and use plugins :** Introduction to plugins, How to use four of the most useful plugins? How to Create our own plugins?

### UNIT 6

[06] [10]

**jQuery UI Essentials :** Introduction to jQuery UI, How to build and use a jQuery UI Download? How to use jQuery widgets? A web page that uses jQuery UI

**Use of jQuery UI interactions and effects :** How to use interactions? How to use effects?

## Ajax

### UNIT 7

[6] [10]

**Introducing Ajax :** What Is Ajax, XHTML and CSS, The Ajax Application Model, Ajax and the Server-Side Technologies, Writing the HTTP Response, The Server-Side Technologies, ASP.NET, PHP, Java Servlets, Which One Should You Use?

**Ajax Techniques :** The XMLHttpRequest Object, Creating an XMLHttpRequest Object, The POST Method , Advantages and Disadvantages of Using the POST and GET Methods , Other Ajax Techniques

### UNIT 8

[4] [5]

**Working with XML :** XML Basics, Using CSS with XML Data.

**Web Services, APIs, and Mashups :** What Is a Web Service, Consuming a Third-Party Web Service, Integrating a Web Service into Your Ajax Application, Mashups, How Ajax Helps Enable the Use of Mashups.

### UNIT 9

[6] [10]

**XSLT and XPath :** XSLT and Its Purpose, XSLT Elements, XSLT Support in the Main Browsers, XPath and Its Purpose, Basic XPath Functionality, Querying in an XML Document Using XPath.

**Patterns :** Design Pattern Background, Form Validation, Types of Design Patterns

**Working with External Data:** Working with XML News Feeds, Extracting Data from an XML Feed, Building an Online Feed Reader with Ajax.

**REFERENCES:**

1. Nicholas C. Zakas, “Professional JavaScript for Web Developers”, Wiley India
2. Zak Ruvalcaba, Mike Murach, “Murach’s JavaScript and jQuery”, Shroff Publishers Distributors Pvt. Ltd.
3. Chris Ullman, Lucinda Dykes, “Beginning Ajax”, Wiley Publishing, Inc.
4. Ivan Bayross, “Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP” –BPB Publication – 4<sup>th</sup> Edition.
5. Jonathan Chaffer, Kari Swedberg, “Learning jQuery”, 4<sup>th</sup> Ed. , Shroff Publishers Distributors Pvt. Ltd.

## **CA-5.2 Theoretical Computer Science (without Proof)**

### **UNIT - 1 Finite Automata: [12] [15]**

Sets, relations, functions, graphs, trees, mathematical induction, Finite Automata(FA), definition, description, transition systems, acceptability of a string, NFA, DFA, equivalence of DFA and NFA, Melay Moore model, minimization of automaton, Applications.

### **UNIT – 2 Formal Languages: [6] [15]**

Formal languages, Chomsky classification of languages, languages, their relation and automaton.

### **UNIT - 3 Regular Expressions: [14] [15]**

Regular expressions, FA and regular expressions, pumping lemma for regular sets, applications of pumping lemma, closure properties of regular sets, regular sets and regular grammars.

### **UNIT - 4 Context Free Languages: [10] [15]**

CFLs and derivation trees, ambiguity in Context-Free Grammars (CFGs), simplification of CFGs, Normal Forms for CFGs(CNF and GNF), pumping lemma for CFLs, decision algorithms for CFLs.

### **UNIT - 5 Push Down Automata: [8] [15]**

Pushdown Automaton (PDA), informal description, basic definitions, acceptance by a PDA, PDA and CFLs.

### **REFERENCES :**

1. Theory of Automata and Formal Languages, Smita Rajpal, GALGOTIA Publications.
2. J.E.Hopcraft, R. Motwani and J.D.Ullman, Introduction to Automata Theory languages & Computation, Pearson Education Asia.
3. K.L.P.Mishra, N. Chandrashekharan, Theory of Computer Science, PHI.
4. Martin John C., Introduction to Language & Theory of computation(TMh).

## CA 5.3 Software Engineering

### UNIT 1

[08] [10]

System Concept: Definitions, Types, Characteristics of system, Software Engineering: Definition of Software, types, characteristics, myths, definition of software engineering, Role of Software Engineer, System Analysts and Users in software development

### UNIT 2

[12] [20]

SDLC: Phases of SDLC: Feasibility Study, Requirements collection, Fact Finding Methods, Systems Analysis, Systems Design, Testing, On-site Implementation and Maintenance, Software Life Cycle Models: Waterfall Model, Spiral Model, Prototyping, Incremental process model Requirement Analysis and specifications: Feasibility study, Requirement elicitation, analysis, documentation, validation and management

### UNIT 3

[10] [15]

Software design: conceptual and technical designs, modularity: module coupling and cohesion, Design strategy: Bottom-Up, Top-Down, Hybrid design, Object Oriented design

### UNIT 4

[10] [20]

Process Modeling: Data Flow Diagrams, System flow Charts, Concept of Object Oriented Modeling, Data Modeling – Database design, Entity Relationship Model, Logic Representation Techniques: Decision Trees, Decision Tables, Pseudo code and Structured English

### UNIT 5

[10] [10]

Introduction to testing, debugging, Computer Aided Software Engineering (CASE), Software Maintenance: Maintenance Process, maintenance models: Quick fix, Iterative, Boehm's Reverse Engineering and configuration Management

### REFERENCES:

1. Senn ,Analysis and Design of Information System 2<sup>nd</sup>Ed.
2. Roger Pressman, Software Engineering Practitioner's Approach ,McGraw-Hill H.E.
3. K.K. Agrawal Software Engineering ,3<sup>rd</sup> Edition
4. Ian Sommerville, Addison Wesley, Software Engineering, 6th Edition.,
5. Elias Awad ,Systems Analysis and Design

## CA 5.4 Computer Graphics

### **UNIT 1 Introduction to Computer Graphics:** [2] [5]

Overview of Computer Graphics, Computer Graphics Application and Software, the Basic Graphics Pipeline, Hardware Basics, Graphics Standards and Primitives, From Window to Viewport

### **UNIT 2 Graphics devices** [10] [10]

Video Display Devices, Raster-Scan Displays, Random-Scan Displays, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Graphics Software, Coordinate representation, Graphics Functions.

### **UNIT 3 Output Primitives:** [14] [20]

Raster Algorithms, Line Drawing Algorithms: DDA, Bresenham's Line Algorithms, Circle Generating Algorithms, Ellipse Generating Algorithm, Fill Algorithms: Boundary, Flood Fill, The Aliasing Problem, Halftoning, Thresholding, and Dithering, Attributes of Output Primitives : Line, Curve, AreaFill, Character Attributes.

### **UNIT 4 2D Transformations:** [14] [20]

Transformations and Matrices, Transformation Conventions, Basic 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Transformation of The Unit Square, Rotation About an Arbitrary Point, A Geometric Interpretation of Homogeneous Coordinates.

### **UNIT 5 2D Viewing and Clipping:** [10] [20]

Viewing Pipeline, Window-to-Viewport Coordinate Transformation, Point Clipping, Line Clipping, Lines Clipping algorithms– Introduction, Cohen-Sutherland Line Clipping, Cyrus-Beck Line Clipping, Liang-Barsky Line Clipping, Nicholl-Lee-Nicholl Line Clipping.

### **REFERENCES:**

1. D. Hearn and M. Pauline Baker, "Computer Graphics (C Version)", Pearson Education, 2nd Edition.
2. Max K. Agoston, "Computer Graphics and Geometric Modeling", Springer Publication, ISBN 1852338180
3. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education.
4. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition.



## **CA 5.5 Computer Animation**

### **UNIT-1 Introduction to Animation**

**[6] [5]**

What is Animation, History of Animation, Principle of Animation, Types of Animation & Animation Tech. Classical Animation, Stop Animation, Clay animation, Frame Animation, Cell Animation, Components used for designing animation such as light box, Live Shooting, Live Photography, Chroma Shoot, Techniques of story boarding for digital film making, Understanding vector animation, Use of Animation in Industries, Concept of 2D, 3D animation

### **UNIT-2 Working with Graphics**

**[2] [5]**

Grouping of Elements, Working with Text, Creating a static text field, Creating a Dynamic text field, Creating a Input text field, Editing Text Field-Scrolling the Text, Breaking Apart The Text Working with Library, Importing Library , Library properties, Common Library, Creating own Library, Working with Colors, Color mixer, creating gradients, opacity of gradients, creating custom gradients, Working with graphics, Importing & working with Bitmaps, Jpeg, gif, etc, Break apart

### **UNIT-3 Creating Flash Elements**

**[8] [15]**

Working With Object, Drawings, creating, moving, drag, cutting, copying, and selecting objects. Transforming Objects, Transforming an object freely, Distorting an object, Modifying an object with envelope, modifier, Scaling an object, Rotating & skew an object, Flipping an object, restoring a transformed object, Working With Symbol & Instances, About the symbol, creating and deleting symbols, duplicate and modify an instance of a Symbol, Types of Symbol- Movie clip, Button, Graphic, Creating Dynamic Buttons, editing buttons, converting an existing into a movie clip, placing movie clip symbol inside the button symbol, Marking Positions - What is Onion Skinning & its Types & uses.

### **UNIT-4 Working with Layers**

**[6] [5]**

Introduction to layers, Hide & Show Layers ,Lock a Layer, Add and name layer, change the orders of layers, organize layers in folder, Type of Layers-Guide layer, Mask layer, layer properties, Masking Animation, Masking Frame by Frame

### **UNIT-5 Twined Animation**

**[6] [5]**

Motion Twine Animation, Creating motion twine-setting the property of twining object, additional twine on existing, layer Editing the motion path of an twine – changing the position, location, deleting the motion, path, applying motion preset, Shape twine Animation: Creating shape twine-setting the property of twining object, additional twine on existing layer Applying Path, orient to path, Frame by Frame Animation: Creating frame by frame animation

**UNIT-6 Effects****[2] [5]**

Timelines Effect, Using Alpha, Blur, Glow, Bevel, Drop Shadow, Adding effects to Buttons

**UNIT-7 Action Script****[4] [5]**

Introduction to Flash Action Script, Add a script to button by using script assist mode, Add frame scripts to timeline by using script assist mode, Add a frame script to the title movie clip

**UNIT-8 Adding Interactivity****[4] [5]**

Setting up your workspace, Name button instances, Add a scene, Move between buttons with the stop() action, Link the buttons to the scene, User behavior to play an MP3 file,

**UNIT-9 Create a form with conditional logic****[6] [10]**

Add an input text field to collect form data, Add submit button to the form, Add an error() message, Add a confirmation message, Add a stop() action, Add conditional logic for the submit button, Write a function for Try Again button

**UNIT-10 Working with Sound & Video****[02] [05]**

Working with sound: Importing Sound file, adding sound to the timeline, adding sound to button, editing sounds, Working with Video: Importing & Editing a video file

**UNIT-11 Flash Web Templates****[02] [05]**

Creating Interactive Webpage, Optimizing Movies & Exporting movies for the web exporting files

**UNIT-12 Publish flash documents****[02] [05]**

Using different publishing formats, Using publishing profiles, Adding flash player detection Publishing for deployment

**REFERENCES :**

1. Kogent Learning Solutions Flash CS3 in Simple Steps , Dreamtech Press
2. Dinesh Maidasani ,Flash 8-Straight to Point ,Firewall Media Publisher
3. Jay Armstrong, Jen deHaan ,Macromedia Flash 8: A Tutorial Guide ,BPB
4. Flash MX Bible, BPB Publication

## **CA Lab -9 Lab on Web User Interface Designing**

### **JavaScript**

1. Create a HTML document to display “Hello World” and apply inline & external JavaScript to demonstrate The<script> Elements with all it’s attribute as-type, src, defer,etc. &The <noscript>Element with the use of Identifiers, variables, ALL types of Comments, All Data Types & operators & display value hold by various variables & identifiers.
2. Create a HTML document using JavaScript to demonstrate Conditional Statements &Lopping Statements, Functions with and without Arguments with function returning value and no value return.. Give appropriate Comments to functions.
3. Create a HTML document using JavaScript to demonstrate Primitive and Reference Values and display them. Also demonstrate garbage collection, Execution Context &Scope of variables & identifiers as-local & global with the use of functions & strict mode.
4. Create a HTML document using JavaScript to check the type and demonstrate The Object Type, Array Type, The Date Type, RegExp Type, Function Type, Wrapper Types, Singleton Built-In Object.
5. Create a HTML document using JavaScript to demonstrate the object, create object and perform inheritance.
6. Create a HTML document using JavaScript to demonstrate use of The Window Object, The location Object, The Navigator Object, The Screen Object, The History Object.
7. Create a HTML document using JavaScript to demonstrate client detection-Capability Detection, Quirks Detection, User-Agent Detection.
8. Create a HTML document using JavaScript to demonstrate DOM in detail, Document Node, type, etc.
9. Create a HTML document using JavaScript to demonstrate Event Flow, Event Bubbling & Event Handlers, The Event Object, Event Types, Memory and Performance, Simulating Events.
10. Create a HTML document using JavaScript to demonstrate Form Basics, Script Text Boxes, Scripting Select Boxes, Form Serialization, Rich Text Editing as a complete Form and validate it using JavaScript.

### **jQuery**

1. Create a HTML document & apply jQuery to demonstrate Selectors.
2. Create a HTML document & apply jQuery to demonstrate Methods and Event Models.
3. Create a HTML document & apply jQuery to demonstrate effects and Animations with slideshow application.
4. Create a HTML document & apply jQuery to validate form and read data submitted using form and display it. Apply jQuery effects & animations also.
5. Create a HTML document & use jQuery plugin. Also create your own plugin &use it.
6. Create a HTML document & use jQueryUI with widgets, interactions & effects.

## Ajax

1. Create a HTML document using Ajax to demonstrate ajax HTTP Response, ajaxXMLHttpRequest Object, Creating an XMLHttpRequest Object, The GET &POST Method.
2. Create a HTML document using Ajax with XML Data. & webservices.
3. Create a HTML document using Ajax with Mashups, XSLT and XPath.
4. Create a HTML document using Ajax to demonstrate various Design Patterns & Design Pattern Background.
5. Create a HTML document using Ajax to validate form and apply ajax design pattern background.
6. Create a HTML document using Ajax to demonstrate use of XML News Feeds&ExtractData from an XML Feed&build an Online Feed Reader.

## **CA Lab -10 Lab on Computer Graphics and Animation**

### **Lab on Computer Graphics**

1. Line drawing algorithm using line attributes
  - 1.1 DDA Line algorithm
  - 1.2 Bresenham's Line algorithm
2. Circle drawing algorithm
  - 2.1 DDA Circle algorithm
  - 2.2 Bresenham's Circle algorithm
  - 2.3 Mid Point Circle algorithm
3. Ellipse drawing algorithm
4. Polygon filling algorithm
  - 4.1 Flood Fill algorithms
  - 4.2 Boundary Fill algorithm
5. Composite 2-D transformation
  - 5.1 2-D Translation
  - 5.2 2-D Rotation
  - 5.3 2-D Scaling
  - 5.4 2-D Reflection
  - 5.5 2-D Shearing
6. Windowing and clipping algorithm
  - 6.1 Point clipping algorithm
  - 6.2 Line clipping algorithms
7. Program to implement Attributes of Line, Curve, AreaFill and Character.
8. Combining all modules to form a single graphics package

### **Lab on Computer Animation**

1. Creating scene with an cartoon drawing
2. Demonstrating use of frame by frame Animation (e.g. Blooming of Flower in a Garden)
3. Demonstrating use of symbols and Filters.( e.g. Draw scene flying of Motion Twine Animation)
4. Demonstrating use of shape Twin Animation ( e.g. Pool Game – Ball Animation)
5. Drawing a house with a pencil. (Use Shape Twine Animation)
6. Demonstrating use of guide Layer & Mask Layer (e.g. Car Racing Game).
7. Creating an e-Card of Birthday Wishes.
8. Create a banner for Website.
9. Demonstrating Motion of Animal (e.g. Any Animal Walking, Running etc.)
10. Creating Animation facial expression with the help of smiley.
11. Create a carton animation using light box and converting it into flash Animation.
12. Create Flash Website Template.
13. Create an Advertisement.
14. Create a Flash presentation on any current issues.

## **SEMESTER-VI**

### **CA 6.1 ERP and SAP**

#### **UNIT-1 Introduction to ERP**

**[12] [ 15]**

Meaning, Need, Merits & Demerits of ERP, Concepts of ERP related technologies, MRP I and MRP II, Management information system (MIS), Data warehousing and Data Mining, Supply chain Management (SCM), OLAP(On Line Analytical Processing)

#### **UNIT-2 ERP implementation lifecycle**

**[12] [20]**

Evaluation and selection of ERP Package, Project Planning & Implementation, Team training and testing, End user training, Going Live, Post evaluation and maintenance, Risks associated with ERP

#### **UNIT-3 ERP Modules and Vendors**

**[12] [15]**

Finance, Sales and Distribution, Inventory Control, Vendors, consultants and users

#### **UNIT-4 ERP Software Overview**

**[04] [5]**

SAP, BAAN, Oracle

#### **UNIT-5 Introduction to SAP**

**[10] [20]**

Meaning History and features of SAP, SAP R/2 Architecture and its Limitations, SAP R/3 Architecture & Application Modules

#### **REFERENCES:**

1. Alexix Leon , Enterprise Resource Planning , TATA McGraw Publication
2. V. K. Garg & N. K. Venkitakrishnan ,ERP Ware: ERP implementation Framework

## CA 6.2 PHP & MYSQL

- UNIT- 1 Introduction to PHP.** [5][10]
- Why PHP?
  - Starting PHP Script.
  - Printing Single Line.
  - Variables and Constants.
  - Comments.
- UNIT- 2 PHP Language basics** [10][15]
- Structure and syntax
  - If statement, Switch statement.
  - For Loop, While Loop, Do – While Loop.
  - Operators
  - Using PHP \$\_GET, \$\_POST
  - Working with forms: Processing forms, Form Validations, Linking form together  
Introduction to cookies and sessions
- UNIT- 3 Arrays.** [5][10]
- Declaring PHP Array, One Dimensional array, Two dimensional array, and Associated Array.
  - Describing arrays.
  - Sorting arrays, Foreach constructs
  - Taking Advantages Of arrays in Application.
  - PHP string Manipulation
- UNIT- 4 PHP Function , PHP Function with Argument :** [10][15]
- Understand what is function,
  - Need of Function in PHP
  - Advantage of Function over statements
  - PHP Function declaration with Example,
  - PHP Function Calling, PHP Function with arguments
  - Default Arguments in Function
  - Types of arguments in Function, Function argument with call by value,  
Function argument with call by reference
- UNIT- 5 Using PHP with MySql db.** [15][20]
- Introduction to MySql db.
  - Using SQL Commands.
  - Interacting with databases .
  - Modifying database records using php.
  - Take Advantage of PHP built in functions which are related with db in general and MySql specifically.
- UNIT- 6**
- Advances in PHP** [5][5]
- Emailing in PHP, Building CMS, Mailing.

**REFERENCES:**

1. Ivan Bayross, Sharanam Shah, PHP for Beginners, THE X Team , SPD
2. Dave Mercer, Allan Kent, Steven Nowicki, David Mercer, Dan Squier, Wankyu Choi, Beginning PHP5, Wiley Publishing(Wrox) ISBN: 0-7645-5783-1
3. Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner, ,“Beginning PHP, Apache, MySQL Web Development”, Wiley Publishing(WROX),March 2004, ISBN: 978-0-7645-5744-6



## CA- 6.3 Software Testing

### **UNIT- 1 Fundamentals of Testing:** [6] [10]

Human and errors, Testing and Debugging, Software Quality, Requirement Behavior and Correctness, Fundamentals of Test Process, Psychology of Testing, General Principles of Testing, Test Metrics.

### **UNIT- 2 Role of Testing in SDLC:** [8] [10]

Review of software development models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic)

### **UNIT- 3 Approaches to Testing – I:** [4] [10]

Static Testing, Structured Group Examinations, Static Analysis, Control flow & Data flow, Determining Metrics.

### **UNIT- 4 Approaches to Testing – II:** [15] [20]

Dynamic Testing, Black Box Testing, Equivalence Class Partitioning, Boundary Value Analysis, State, Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing and Advanced black box techniques, White Box Testing, Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage, Advanced White Box Techniques, Instrumentation and Tool Support, Gray Box Testing, Intuitive and Experience Based Testing

### **UNIT- 5 Test Management:** [15] [20]

Test Organization, Test teams, tasks and Qualifications, Test Planning, Quality Assurance Plan, Test Plan, Prioritization Plan, Test Exit Criteria, Cost and economy Aspects, Test Strategies, Preventive versus Reactive Approach, Analytical versus heuristic Approach, Test Activity Management, Incident Management, Configuration Management, Test Progress Monitoring and Control, Specialized Testing: Performance, Load, Stress & Security Testing

### **UNIT- 6 Testing Object Oriented Software:** [2] [5]

Introduction to OO testing concepts, Differences in OO testing

### **REFERENCES:**

1. Spillner, Tilo Linz, Hans Schaefer, Software Testing Foundations, Andreas Shoff Publishers and Distributors
2. Srinivasan D and Gopalswamy R, Software Testing: Principles and Practices Pearson Ed, 2006

3. Aditya P. Mathur Foundations of Software Testing, Pearson Education custom edition 2000
4. Robert V Binder, Testing Object Oriented Systems: models, patterns and tools Addison Wesley, 1996
5. Roger S. Pressman, Software Engineering – A practitioner's approach 5th Edition, McGraw Hill
6. GJ Myers, The art of software testing , Wiley.

## **CA 6.4 DATA WAREHOUSING AND MINING**

### **UNIT-1 DATA WAREHOUSING :** [10] [15]

Data warehousing Components -Building a Data warehouse -- Mapping the Data Warehouse to a Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools -Metadata.

### **UNIT-2 BUSINESS ANALYSIS** [10] [15]

Reporting and Query tools and Applications - Tool Categories - The Need for Applications - Cognos Impromptu - Online Analytical Processing (OLAP) - Need - Multidimensional Data Model - OLAP Guidelines - Multidimensional versus Multirelational OLAP - Categories of Tools - OLAP Tools and the Internet.

### **UNIT-3 DATA MINING** [10] [15]

Introduction - Data - Types of Data - Data Mining Functionalities - Interestingness of Patterns - Classification of Data Mining Systems - Data Mining Task Primitives - Integration of a Data Mining System with a Data Warehouse - Issues -Data Preprocessing.

### **UNIT-4 ASSOCIATION RULE MINING AND CLASSIFICATION** [12] [20]

Mining Frequent Patterns, Associations and Correlations - Mining Methods - Mining Various Kinds of Association Rules - Correlation Analysis - Constraint Based Association Mining - Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification - Rule Based Classification - Classification by Backpropagation - Support Vector Machines - Associative Classification - Lazy Learners - Other Classification Methods - Prediction

### **UNIT-5 CLUSTERING & APPLICATIONS AND TRENDS IN DATA MINING** [8] [10]

Cluster Analysis - Types of Data - Categorization of Major Clustering Methods – Kmeans Partitioning Methods - Hierarchical Methods - Density-Based Methods -Grid

Based Methods - Model-Based Clustering Methods - Clustering High Dimensional Data Constraint - Based Cluster Analysis - Outlier Analysis - Data Mining Applications.

### **TEXT BOOKS:**

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw - Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

**REFERENCES:**

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

## CA 6.5 Cyber Security

### **UNIT-1 Cyber Crimes and Cyber Terrorism [12] [20]**

Cyber crimes and the categories of crime namely: Cyber frauds, Cyber thefts, Cyber stalking, Cyber Terrorism, Cyber Defamation. Hacking, Types of hackers, Hacking v/s Cracking  
Virus: Definition, Types of viruses (Data diddling, Salami attack, Denial of Service attack, Virus/Worm attacks, Logic Bombs, Trojan attacks, Internet time theft (Web jacking), Anti-Virus - functions of anti-virus, advantages and disadvantages of anti-virus. Prevention to Computer Crime.

### **UNIT-2 Internet Security Concept [7] [15]**

Concept of security, Secure Transaction, Privacy issues, Security Procedure: Firewall and Types, Encryption, Password, Access Control List, Digital certificate, Biometrics, Security Products.

### **UNIT-3 Cryptography & Digital Signatures [12] [15]**

Introduction of Cryptography, Types, Goals, Key and Key-pair. Concept of Digital and Electronic Signature, Recognition and authentication of Digital and Electronic Signature, Benefits and Drawbacks.

### **UNIT-4 Salient Features of IT Act, 2000 [8] [10]**

Definitions. Digital and Electronic Signature, Authentication, Electronic Governance, Various authorities under IT Act and their powers, Penalties, Offences, Miscellaneous.

### **UNIT-5 Electronic Data Interchange [4] [5]**

EDI: Concept and legal issues, UNCITRAL Model Law, Cryptography Laws.

### **UNIT-6 Law of Intellectual Property [6] [10]**

Copyright Act, Trade and Merchandise Act, Patent Act, Domain Name Disputes, Cyber-squatting.

### **REFERENCES:**

1. S. K. Saxena , Information technology law concepts, and enhancements ,
2. Dummies , Computer Security
3. Michael E. Kabey ,Enterprise Security – protecting information assets
4. Karnika Seth , Cyber Laws in the Information Technology Age
5. Aparna Viswanathan , Cyber Law Indian and International Perspectives
6. Dr Jyoti Rattan , Cyber Laws and Information Technology
7. Prof. Vimlendu Tayal ,Cyber Law Cyber Crime Internet and E Commerce
8. Karnika Seth ,Computers Internet and New Technology Laws

## CA Lab -11 Lab on Php & MySql

### PHP

1. PHP installation on Windows, configuration with IIS
2. Demonstration of array functions for single & multidimensional arrays, sorting etc
3. Printing of HTML form data on server
4. Use of global variables
5. Demonstration of session management with cookies, \$\_Session, hidden fields
6. Displaying file/Directory attributes
7. File & directory explorer
8. Creation of MySql database from command prompt, demonstration of various SQL queries
9. Accessing MySql data from PHP script: Displaying tables and fields along with their types and constraints, table data in tabular format

## CA Lab -12 Project & Viva-voce

### Guidelines for Project:

1. Each student shall have to carry out the project work based on computer application in a life situation based on the language/ software learned in the course. A project may be any outside organization or on a sub system of an organization.
2. The project work should be carried out individually. No group work is allowed in the work. The project title should not be repeated.
3. The topic of the project should be decided with the consultation & guidance of a teacher of the institute/college. The project should be necessarily innovative and solving. No teacher shall be entrusted with more than 10 students for guidance and
4. The institute/ college shall submit the detailed list of candidates with Project Titles and guide to the university within a week of title finalization of such titles by the guide/ Such a title finalization must be completed before end of the second week of
5. The student should clearly mention the need of project , database(s), files required for the DFD , Normalization, ERD, software used for the project, reasons for selection of software, inputs required, outputs produced etc.
6. Application should be menu driven and should provide the facilities of storage of modifications in existing data, deletion of unwanted data, and viewing of data.
7. The student has to write a report based on the actual work undertaken during the the specific selected enterprise/ organization or sub system and get it certified by teacher that the Project report has been satisfactorily completed and submit the same to the Head / Director of the institute /Principal of the college.
8. One copy of the report submitted by the student shall be forwarded to the University.
9. The project work will carry maximum 100 marks, of which internal teacher shall award out of maximum 40 marks on the basis of project work done by the student as a assessment. Remaining marks shall be awarded out of maximum 60 marks by during Viva-voce, by the panel of the external examiners.

## SEMESTER - VII

### CA 7.1      **Design and Analysis of Algorithms**

**UNIT-1. Introduction****[03] [05]**

Problem, Instance, Asymptotic complexity, Some stylistic issues, Analysis of Algorithms, Principles of Algorithm Design, Recurrence, Removal of recursion,

**UNIT-2. Elementary Data Structures****[03] [05]**

Trees, Heaps and heap sort, Sets and disjoint set union, graphs.

**UNIT-3. Divide and conquer****[06] [10]**

Introduction, Binary Search, MaxMin, Mergesort, Quicksort, Median Finding, Strassen's Matrix multiplication.

**UNIT-4. Greedy Algorithms****[08] [15]**

Introduction, Set of Intervals, Fractional Knapsack, Huffman Coding, Minimum spanning trees: Prims and Kruskal, Dijkstra's Algorithm for single source shortest path.

**UNIT-5. Dynamic Programming****[10] [15]**

Introduction, Knapsack (0/1), Longest common subsequence, Matrix chain multiplication, Job scheduling problem, Topological sort, All Pair Shortest Path.

**UNIT-6. Basic Search and Traversal Techniques****[06] [05]**

Introduction, Binary Tree Traversal, Search and Traversal Techniques for Graphs, Code Optimization.

**UNIT-7. Backtracking****[08] [10]**

Introduction, N-queen problem: 4 queen, 8 queen, Graph coloring problem, Branch and bound technique, LC-search.

**UNIT-8. NP-Completeness****[06] [10]**

Non deterministic algorithms, searching, sorting, Introduction to NP-Complete, Search/Decision, SAT, Independent Set, Subset Sum & Partition, Hamiltonian Circuit.

**REFERENCES :**

1. Horowitz and Sahni, Fundamentals of Computer Algorithms, Galgothia publications.
2. Cormen, Leiserson and Rivest, Introduction to Algorithms, Prentice Hall of India.
3. Anany Levitin, Introduction to the design and analysis of Algorithms, Pearson Education
4. P. Dave, H. Dave, Design and Analysis of Algorithms, Pearson Education, 2008.
5. Sanjay Dasgupta, Christos Papadimitriou and Umesh Vazirani, Algorithms, Tata McGraw-Hill Edition.
6. Aho, Hopcroft and Ullman, The Design and Analysis of Algorithms, Addison-Wesley Publication, 2000
7. Simon Harison, James ross, Algorithms, Wiley India, 2006
8. Jon Kleinberg and Eva Tardos, Algorithm Design, Pearson education, 2006



## CA 7.2 Automata Theory and Computability

### UNIT-1

[08] [15]

Grammars, Languages generated, Chomskian Hierarchy, CFG, Ambiguity, Reduced grammars, Normal forms

### UNIT-2

[12] [20]

FSA, NFSA, NFSA with  $\epsilon$  moves, Regular expressions, Equivalence of regular expression and FSA, Equivalence of type 3 grammars and FSA, Pumping lemma, Closure and decidability results, Myhill- Nerode theorem, Minimization, FSA with output, Problems

### UNIT-3

[10] [15]

Pushdown Automata, Acceptance by final state and empty store, Equivalence to CFG, Deterministic PDA

### UNIT-4

[08] [15]

Turing Machines -Construction, Techniques of TM construction, TM as acceptor and i/o device, Problems. Generalized and restricted versions.

### UNIT-5

[12] [10]

Halting problems - Universal TM-recursive and recursively enumerable sets - Decidability - Rice's Theorem, Time and Tape complexity of TM, P and NP, Cook's theorem - NP-Complete Problems.

## REFERENCES

1. K.Krithivasan and R.Rama; Introduction to Formal Languages, Automata Theory and Computation; Pearson Education, 2009.
2. J.E.Hopcroft, R.Motwani and J.D.Ullman, "Introduction to Automata Theory Languages and computation", Pearson Education Asia, 2001.

## ADDITIONAL READINGS

1. Peter Linz, "An Introduction to Formal Language and Automata", 4th Edition, Narosa Publishing house, 2006.
2. M.Sipser; Introduction to the Theory of Computation; Singapore: Brooks/Cole, Thomson Learning, 1997.
3. John.C.martin, "Introduction to the Languages and the Theory of Computation", Third edition, Tata McGrawHill, 2003.

## CA 7.3 Artificial Intelligence

**UNIT-1. Introduction:** [4] [5]

What is Artificial Intelligence?, The AI Problems, The Underlying Assumption, What is an AI Technique, The Level of the Model, Criteria for Success, Some General References, One Final Word.

**UNIT-2. Problems, Problem Spaces, and Search:** [4] [5]

Defining the Problem as a State Space Search, Production systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs, Additional Problems.

**UNIT-3. Heuristic Search Techniques:** [4] [5]

Generate-and- Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

**UNIT-4. Knowledge Representation:** [4] [10]

Knowledge Representation Issues, Representations and Mappings, Approaches to knowledge Representation, Issues in Knowledge Representation, The Frame Problem.

**UNIT-5. Using Predicate Logic:** [6] [5]

Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

**UNIT-6. Representing Knowledge Using Rules:** [4] [10]

Procedural Versus Declarative knowledge, Logic Programming, Forward versus Back ward Reasoning, Matching, Control Knowledge.

**UNIT-7. Symbolic Reasoning under Uncertainty:** [4] [10]

Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem solver, Implementation: Depth-First Search, Implementation: Breadth\_First Search.

**UNIT-8. Statistical Reasoning:** [10] [10]

Probability and Baye"s Theorem, CertaintyFactors and Rule-Based Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic.

**UNIT-9. Weak Slot-and-Filler Structures:** [4] [5]

Semantic Nets, Frames.

**UNIT-10. Strong Slot-and Filler Structures:** [4] [5]

Conceptual Dependency, Scripts, CYC.

**UNIT-11. Knowledge Representation Summary:**

**[2] [5]**

Syntactic-Semantic Spectrum of Representation, Logic and Slot-and-Filler Structures, Other Representational Techniques, Summary of the Role of Knowledge.

**REFERENCES :**

1. Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGrawHill.
2. Stuart Russel, Peter Norwig, Artificial Intelligence – A Modern Approach , Pearson Education.

## CA 7.4 Advanced Java Programming

### **UNIT-1 Java Basics Review:** [10] [15]

Java streams- Text input and output, Reading and writing Binary data, Object serialization;  
Networking- Socket Programming; Exception Handling, Multithreading; Collection Classes-  
HashSet , LinkedHashSet ,Stack, LinkedList , ArrayList , Vector ,HashMap, Hashtable,  
Arrays.

### **UNIT-2 Distributed Computing:** [8] [15]

Remote Method Invocation- Introduction, Architecture, RMI Object services, stub and  
Skeleton, Steps of developing an RMI system; Overview- IIOP, Interface definition language  
, CORBA , JINI, JNI.

### **UNIT-3 Java Beans and EJB:** [12] [15]

Java Bean- Concepts, Writing process, Applications, Properties and Events, Property Editors,  
Customizer , Persistence; Enterprise JavaBeans- Introduction, Specification, Architecture,  
Container, Types, Life cycle, Applications.

### **UNIT-4 Servlets and Java Server Pages:** [12] [20]

Servlets – Concepts, Architecture, Servlet Container Writing Process, API, Life Cycle,  
Hierarchy, ServletConfig, ServletContext, Programming and deployment, Servlet and HTML  
Form, Session Management, JDBC ; Java Server Pages – Introduction, JSP Tags (Scripting  
Elements), JSP Containers, Architecture,  
API, JSP Objects, JSP and JavaBeans, JSP and Servlets.

### **UNIT-5 Struts:** [08][10]

Introduction, Understanding Scopes, Custom Tags, The MVC Design Pattern, Simple  
Validation, Processing Business logic, Basic Strut tags, Configuring Struts, Introduction,  
String, Hibernate.

## **REFERENCES :**

1. Arnold Doray Beginning Apache Struts From Novice to Professional , Apress ISBN: 978-1-59059-604-3
2. Eric Pugh, Joseph D. Gradecki , Professional Hibernate, Wiley Publishing, Inc., ISBN: 0-7645-7677-1
3. Craig Walls, Ryan Breidenbach, Spring In Action, Manning Publishing Co., ISBN: 1-932394-35-4
4. Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press,  
Eight Edition.
5. SoumadipGhosh, "Web Technology with Advanced Java", University Science Press, ISBN:978-93-80856-78-0

## **CA 7.5 Advanced Data Base Management Systems (ADBMS)**

**UNIT- 1.** [08] [10]

### **Getting Started with Database Architecture and Managing Data Storage**

Introduction to Database, Database System Environment – an Example, Data Models, Schema and Instances, Three Schema Architecture of Database, Component Modules of Database Systems, Database System Utilities, Memory Hierarchy and Storage Devices, Storage of Databases, Buffering of Blocks, Places File Record on Disk, Files of Unordered Records and Unordered Records

**UNIT-2** [08] [10]

### **Database Tuning and Database Security**

Physical Database Design in Relational Database, Overview of Database Tuning and Relational Systems, Database Security and its Issues, Granting and Revoking Privileges, Role Based Access Control for Multilevel Security, Encryption and PKI.

**UNIT-3** [10] [15]

### **Backup & Recovery in Database and Database Indexing**

Providing Backup and Recovery, Recovery Concepts, Recovery Techniques Based on Deferred Update and Immediate Update, Recovery in Distributed Database, Distributed Database in Oracle, Types of Single Level Ordered Indexes, Primary Index, Cluster Index, Secondary Index, Multilevel Index.

**UNIT-4** [08] [15]

### **Managing Different Databases and Distributed Databases**

Overview of Temporal and Deductive Databases, Temporal Database Concepts, Deductive Database, Distributed Database Concepts, Data Fragmentation, Allocation Techniques for Distributed Database Design, Types of Distributed Database Systems

**UNIT-5** [08] [15]

### **Emerging Database Technologies and Object-Relational Databases**

Overview of Object Relational Features, Current Trends of Database Technology, Implementation and Relational Issues of Extended Type, Nested Relational Model, Mobile Databases, Multimedia Databases, Geographic Information Systems, Genome Database Systems.

**Oracle Net, Utilities, Backup and Recovery**

Oracle Net Configuration, Concept of Service Name, Listener, Using Oracle Net Configuration Assistant, Using Oracle Net Manager, Bulk Insert: Using SQL\*Loader, Managing Large Databases

**Text Books:**

1. Ramesh Elmasari, Shamkant B. Navathe, “Fundamentals of Database Systems”, Pearson Education, 5th Edition
2. Kevin Loney, Maklene Theriault, “Oracle 9i, DBA Handbook”, Oracle Press, TMGH Publications

**REFERENCES :**

1. Sam R. Alapati, “Expert Oracle9i Database Administration”, Apress,
2. Bob Bryla, Kevin Loney, “Oracle Database 11g DBA Handbook”, Oracle Press, TMGH Publication
3. S. K. Singh, “Database Systems Concepts, Design & Applications”, Pearson Education.

## CA Lab -13

## Lab on Design and Analysis of Algorithm

1. Write a program to implement removal of recursion for
  - Finding maximum from array
  - Binomial coefficient  $B(n,m) = B(n-1, m-1) + B(n-1, m)$ ,  $B(n,n) = B(n,0) = 1$
  - Searching element from array
2. Write a program for creating max./min. heap using
  - INSERT
  - ADJUST/HEAPIFY
3. Write a program to implement weighted union and collapsing find operations.
4. Write a program for searching element from given array using binary search for  $n=1000, 2000, 3000$  find exact time of execution.
5. Write a program to find minimum and maximum from a given array (use D and C).
6. Write a program for sorting given array in ascending/descending order with  $n=1000, 2000, 3000$  find exact time of execution using
  - Heap sort
  - Merge sort
  - Quick sort
7. Write a program for matrix multiplication using Strassen's matrix multiplication.
8. Write a program to find solution of Fractional Knapsack instant.
9. Write a program to find minimum spanning tree using Prim's.
10. Write a program to find minimum spanning tree using Kruskal's algorithm.
11. Write a program to find single source shortest path using Dijkstra's Algorithm.
12. Write a program to find solution of Knapsack instant (0/1).
13. Write a program to find solution of LCS.
14. Write a program to find solution of Matrix Chain Multiplication.
15. Write a program to implement topological sort.
16. Write a program to find shortest path using all pair path.
17. Write a program to implement CODE1.
18. Write a program to implement CODE2.
19. Write a program to find all solutions for **N-queen** problem using backtracking.
20. Write a program to find only in-equivalent solutions for **N-queen** problem using backtracking.
21. Write a program for graph coloring using backtracking.



## **CA Lab -14    Lab on Advanced Java**

1. Write java program(s) that demonstrates Java streams.
2. Implement the Java program(s) for server and client to demonstrate networking in Java using  
Sockets. (Single server and single client, Single server and multiple clients).
3. Write java program(s) that demonstrates concept of Exceptions.
4. Write java program(s) that demonstrates concept of Multithreading.
5. Write a Java program(s) that demonstrates the use of Collection Classes.
6. Write a Java program(s) that demonstrates the use of RMI technology.
8. Write a Java program(s) that demonstrates Java Bean.
9. Write a Java program(s) that demonstrates EJB.
10. Write a Java program(s) that demonstrates use of Servlets

## **SEMESTER-VIII**

### **CA 8.1      Software Project Management**

**UNIT-1 Introduction:** **[4] [5]**

What is project? What is project management? The role of project manager, The project management profession, Project life cycle.

**UNIT-2 Technology Contexts:** **[8] [10]**

A systems view of project management, Understanding organizations, Stakeholder management, Project phases and the project life cycle, The context of information technology projects.

**UNIT-3 Introductions:** **[10] [15]**

Developing the project schedule, Project management software tools, Developing the project budget, Finalizing the project schedule and budget, Monitoring and controlling the project, The project communications plan, Project metrics, Reporting performance and progress, Information distribution.

**UNIT-4 The Importance Of Project Risk Management:** **[8] [15]**

Risk management planning, Common sources of risk on information technology projects, Risk identification, Qualitative risk analysis, Quantitative risk analysis, Risk response planning, Risk monitoring and control, Using software to assist in project risk management.

**UNIT-5 The Importance Of Project Procurement Management** **[08] [15]**

Planning purchases and acquisitions, Planning contracting, Requesting seller responses, Selecting sellers, Administering the contract, Closing the contract, Using software to assist in project procurement management, Outsourcing.

**UNIT-6 Change Management** **[4] [5]**

The nature of change, The change management plan, Dealing with resistance and conflict.

**UNIT-7 Leadership & Ethics in Projects:** **[4] [5]**

Project leadership, Ethics in projects, Multicultural projects,

**UNIT-8 Administration & Evaluation:** **[4] [5]**

Project implementation, Administrative closure, Project evaluation.

**REFERENCES :**

1. Kathy Schwalbe, Information Technology Project Management : Thomson Publication

2. Jack Marchewka, Information Technology Project Management providing measurable organizational value, Wiley India
3. Stellman & Greene, Applied software project management, SPD
4. Richard Thayer, Software Engineering Project Management , Edward Yourdon Wiley India

## **CA-8.2 Internet Computing**

### **UNIT-1**

**[14][25]**

Application and Page Frameworks , Asp .Net Server Controls and Client Side Scripts, Asp .Net Web Server Controls., Validation Server Control, Working with Master Pages, Themes and Skins.

### **UNIT-2**

**[22][25]**

Data Binding in Asp .Net 3.5, Data Management with ADO .Net, Querying with LINQ, Site Navigation, Personalization, Membership and Role Management, Portal Framework with Web Parts.

### **UNIT-3**

**[14][25]**

Asp .Net Ajax, Security, State Management, Caching, User and Server Controls, File I/O and Streams, Building and Consuming Services, Packing and Deploying Asp .Net Application.

### **REFERENCES:**

1. Bill Evjen ,Scott Hanselman, Devin Rader, Professional Asp .Net 3.5 in C# and VB ,Wiley Publishing Inc. ISBN:978-0-470-18757-9.
2. Dino Esposito, Programming Microsoft ASP.NET 3.5, Microsoft Press, 2008.

## **CA-8.3 Network Programming**

### **UNIT – 1 Internet Basics: [6] [10]**

What Is Internet, What Special About Internet? Dial Up Connection/Direct Connection; Slip Or PPPWWW: The Client Site, Server Site, Web Pages In HTML, CGI Programming Overview, Environment Variables, Difference Between HTML And DHTML, ECOM And Portals.

### **UNIT – 2 Internet Internals: [6] [10]**

Transmission Control Protocol/Internet Protocol (TCP/IP), FTP, HTTP, WAIS (Wide Area Information Service) TELNET, Domain Name System: Name for Machine, Flat Name Space, Hierarchical Names Internet Domain Names, Domain Name Resolution.

### **UNIT – 3 Network Addressing: [8] [10]**

IP address, Physical address, Port address, Concepts & examples. IP Address, Electronic Mail Address, URL, E-Mail Basic, SMTP IPv4 , IPv6 addressing Concepts & examples, Differences ARP, RARP, BOOTP, DHCP

### **UNIT – 4 Client Server Software Issues: [8] [10]**

The Client Server Model and Software design, Socket Interface, Concurrent Processing in Client-Server Software , Program Interface to Protocol, Algorithms and Issues in Client Software design, example Client Software,

### **UNIT – 5 Server Programming: [8] [15]**

Algorithms & Issues in Server Software Design, Iterative Connectionless Server, Iterative Connection Oriented Server, Single Process Concurrent Server , Concurrent Connection Oriented Server, Multiprotocol Server , Multi-Service Server, Super Server, Chat Server.

### **UNIT – 6 Remote Procedure Call: [4] [10]**

External Data Representation, Remote Procedure Call concept, RPCgen concept, Network File System (NFS).

### **UNIT – 7 Basics of Socket Programming in JAVA: [10] [10]**

Creating Socket, Sending & Receiving Data through a Socket, using Socket for Client Server, TCP Server, UDP Server.

## **REFERENCES**

1. Douglas E. Comer, David Stevens ,Intranetworking with TCP/IP volume III Client Server Programming and Applications, ISBN-81-7808-488-0 PHI.
2. Douglas E. Comer, David Stevens ,Internetworking with TCP/IP volume I, Principles protocols & Architecture, (3rd edition), ISBN - 81-203-1053-5, PHI.

3. Internetworking with TCP/IP volume II Design Implementation, and internals, (3rd edition), Douglas E. Comer, David Stevens ISBN -81-203-0927-8, PHI.
4. Scringer LaSalle, Parihar Gupta TCP/IP Bible. (1st edition), Hungry Minds IDG Looks India (P) Ltd
5. TCP/IP Tutorial and Technical Overview, Lydia Parziale, David T. Britt, Chuck Davis, IBM Redbooks, 8<sup>th</sup> edition December 2006.
6. TCP/IP Sockets in Java: Practical Guide for Programmers, Kenneth L. Calvert and Michael J. Donahoo The Morgan Kaufmann Practical Guides Series

## CA 8.4      **Advanced Computer Graphics**

### **UNIT-1. Introduction:** **[2] [4]**

Image processing as picture analysis, Advantages of Interactive Graphics, Representative use of Computer Graphics, classification of Applications, Development of Hardware and Software for Computer Graphics. Conceptual framework for Interactive Graphics

### **UNIT-2. Output Primitives and 2D Transformations:** **[4] [10]**

Filled-Area Primitives, Filling Polygons, Inside-Outside Tests, Edge data structure, Scan-Line Polygon Fill Algorithm, 2D Transformations and Matrices, Transformation Conventions, Reflection and Shear Transformations, Reflection through an Arbitrary Line, Combined Transformations.

### **UNIT-3. 2D Viewing and Clipping:** **[6] [10]**

Viewing Transformations and Pipeline, From Shape to Camera Coordinates, Vanishing Points, Window-to-Viewport revisited, Polygon Clipping Algorithms: Sutherland-Hodgeman Polygon Clipping, Weiler Polygon Clipping, Liang-Barsky Polygon Clipping, Text Clipping.

### **UNIT-4. Three-Dimensional Transformations:** **[6] [10]**

Introduction, Translation, Rotation, Coordinate Axes Rotations, Arbitrary Axis Rotation, Scaling, Shearing, Reflection, Coordinate through Plane Reflection, Reflection through an Arbitrary Plane, Multiple Transformation, Matrix Representation of 3D Transformations, Composition of 3D Transformations.

### **UNIT-5. Three-Dimensional Viewing and Transformations:** **[8] [10]**

Stages in 3D viewing, Viewing Pipe line, Viewing coordinates, View plane, Transformation from Word to View coordinates, Projections: Parallel & Perspective Projections, View Volume, General Projection Transformations, General Parallel – Perspective Projections Transformations, Techniques for Generating Perspective Views, Vanishing Points, the Perspective Geometry and camera models, Orthographic Projections, Axonometric Projections, and Oblique Projections.

### **UNIT-6. Solid Modeling:** **[4] [05]**

Representing Solids, Regularized Boolean Set Operations, Primitive Instancing, Sweep Representations, Spatial-Partitioning Representations - Octree representation, B-Reps, Constructive Solid Geometry, Comparison of Representations.

### **UNIT-7. Visible-Surface Determination:** **[6] [08]**

Techniques for efficient Visible-Surface Algorithms, Classification / Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (Depth-Sorting), Area sub-division method, Visible-Surface Ray Tracing, Comparison of the methods.

**UNIT-8. Illumination and Shading:****[6] [08]**

Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenuation, Phong Shading model, Gouraud Shading, some examples.

**UNIT-9. Curves in Computer Graphics:****[8] [10]**

Curve Representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Parametric Representation of an Ellipse, Parametric Representation of a Parabola, Parametric Representation of a Hyperbola,

Introduction to Curves and Surfaces, Early Historical Developments, Lagrange Interpolation, Hermite Interpolation, Spline Interpolation, Cubic Curves, Bezier Curves, B-Spline Curves, The Standard B-Spline Curve Formulas, Subdivision of Curves,

**REFERENCES :**

1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, "Computer Graphics - Principles and Practice", Second Edition in C, Pearson Education.
2. D. Hearn and M. Pauline Baker, "Computer Graphics (C Version)", Pearson Education, 2nd Edition.
3. D. F. Rogers and J. A. Adams, "Mathematical Elements for Computer Graphics", 2nd Edition, McGraw-Hill International Edition.
4. F. S. Hill Jr., "Computer Graphics using OpenGL", Pearson Education.
5. Max K. Agoston, "Computer Graphics and Geometric Modeling", Springer Publication, ISBN 1852338180



## CA-8.5 Optimization Algorithms

### UNIT- 1 Overview of operations Research: [2] [5]

OR models – OR Techniques

### UNIT- 2 Linear Programming: [10] [20]

Introduction – Graphical solution; Graphical sensitivity analysis– The standard form of linear programming problems – Basic feasible solutions -unrestricted variables – simplex algorithm – artificial variables – Big M and two phase method – Degeneracy - alternative optima – unbounded solutions – infeasible solutions.

### UNIT- 3 Dual problems: [8] [10]

Relation between primal and dual problems – Dual simplex method

### UNIT- 4 Transportation model: [10] [15]

Starting solutions. North West corner Rule - lowest cost method–Vogels approximation method Optimal solutions techniques : MODI, Stepping stone method –Assignment problem

### UNIT- 5 Network Models : [7] [10]

Definitions – CPM and PERT – Their Algorithms, Critical path computation: Construction of time schedule, crashing of project duration.

### UNIT- 6 Game theory: [7] [10]

Two person Zero Sum Games – Mixed strategy games and their algorithms.

### UNIT- 7 Queuing Theory: [6] [5]

Elements of Queuing Model, Classification of Queues and their problems, Queue Models – MM1:( $\infty$ /FIFO), MM1:(N/FIFO)

### REFERENCES :

1. L.C. Jhamb, Quantitative Techniques, Everest Publishing house.
2. Handy A Taha, Operations Research – An Introduction, Pearson Education.
3. Panneer Selvan, Operations Research, Prentice Hall of India.

## **CA Lab -15 Lab on Internet Computing & Advance Computer Graphics**

### **Lab on Internet Computing**

1. Create an ASP .NET application using Web server controls apply appropriate validation to it.
2. Create an ASP .NET application using Master Pages and Themes and Skins
3. Create an ASP .NET application to demonstrate binding of GridView, DataList, Repeater, DropDownList, RadioButtonList, CheckBoxList Control using ADO .NET
4. Create an ASP .NET application to demonstrate LINQ to XML, LINQ to Objects, LINQ to SQL
5. Create an ASP .NET application to demonstrate Navigation controls
6. Create an ASP .NET application to demonstrate User and Role management.
7. Create an ASP .NET application to demonstrate User controls
8. Create an ASP .NET application to demonstrate Web parts
9. Create an ASP .NET application to demonstrate various type of Caching (Data Caching, Output Caching, and SQL Server Cache Dependency).
10. Create an ASP .NET application using Ajax
11. Create an ASP .NET application using Web Service.
12. Create a Sequential Workflow.
13. Create a Conditional Workflow.
14. Create a State Machine Workflow.

### **Lab on Advanced Computer Graphics**

1. Scan-line Polygon filling algorithm
2. Windowing and clipping algorithm
  - 2.1 Window to view port transformation
  - 2.2 Polygon clipping algorithms
3. Composite 2-D transformation
  - 2.1 2-D Reflection
  - 2.2 2-D Shearing
4. Composite 3-D Geometric transformation

- 4.1 3-D Translation
  - 4.2 3-D Rotation
  - 4.3 3-D Scaling
  - 4.4 3-D Reflection
  - 4.5 3-D Shearing
5. Curve representation i.e. B-spline, Polynomial (Cubic) and Bezier curves.
  6. Determination of visible surfaces and lines,
  7. Combining all modules to form a single graphics package.

## CA Lab -16 Lab on Linux Socket Programming

### Note-

- i. All assignments are to be implemented using C language in Linux.
- ii. Install Ubuntu /Fedora/ Red hat Linux
- iii. Encourage students to demonstrate the experiments using networking between two separate machines for Client-Server programs.
- iv. Encourage students to do at least one simple assignment using JAVA on Linux.

### 1. Implement TCP and UDP Client-Server programs for following services:

- a. Echo Service
  - b. Day Time Service
  - c. Chargen Service
  - d. Mathematical Operation on numbers
  - e. Checking number for prime, palindrome etc.
  - f. Calculating factorial
  - g. Calculating Fibonacci series
  - h. Case conversion in given string
2. Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using single process.
  3. Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using multiple processes.
  4. Implement Telnet Server program for providing different types of Telnet Services.
  5. Demonstrate and implement the file transfer using FTP.
  6. Demonstrate and implement Multiprotocol server.
  7. Demonstrate and implement multiservice server.
  8. Develop the Chat server program. The Server should be concurrent such as to provide intercommunication between multiple clients with following feature
    - i) Minimum 2 clients communicate with each other through chat server
    - ii) Each client makes registration, sending its name to server
    - iii) Client sends “Who” message to server to receive list of Active Clients.
    - iv) Sends “Hello to Client\_Name”, from the active client list to initiate the chatting.
    - v) Both clients communicate with each other.
    - vi) Terminates chat with “good bye” message.

## **SEMESTER-IX**

### **CA 9.1 Compiler Construction**

#### **UNIT – 1 Introduction to Compilation: [5][10]**

Compiler Basics, Issues in Compilation, Phases of Compilation: the Analysis – Synthesis Model, Compiler Construction Tools.

#### **UNIT – 2 Designing a Lexical Analyzer Relations: [10][15]**

Role of Lexical Analysis, Input Buffering, Specification of Tokens, Recognition of Tokens, Finite automata, Conversion from regular expression to NFA, Deterministic finite automata, Conversion from NFA to DFA, Minimization of DFA.

#### **UNIT – 3 Designing Syntax Analyzer: [20][25]**

Role of Syntax Analyzer, Classification of parsers, Top-Down Parsing: Introduction, Problems in top-down parsing, Recursive Parsing, Problems in Recursive Procedures, Predictive Parsing, Error Handling in Predictive Parsers, Bottom Up Parsing: Shift Reduce Parser, Actions of shift reduce parser, Construction of parse tree, Operator Precedence Parsing, Components of operator precedence parsers, Parsing action, Construction of operator precedence parsers, Advantages and disadvantages of operator precedence Parsing. LR Parsing: Simple LR parser, LR(1) parser, LALR parser.

#### **UNIT – 4 Intermediate Code Generation: [5][10]**

Need For Intermediate Code Generation, Intermediate Forms: Polish Notation, Quadruples, Triples, Indirect Triples & Blocks.

#### **UNIT – 5 Code Optimization: [5][10]**

Introduction, need for code optimization, Classification of code optimization techniques: Optimization techniques that work on machine code, Optimization techniques that work on intermediate forms of source code i.e. Optimization with in Basic Blocks: Folding, Redundant operation elimination, Optimization with in Loop: Strength Reduction, Dead code elimination, Moving operation within block out of block.

#### **UNIT – 6 Symbol Table Organization: [5][5]**

Introduction, Methods of organizing a symbol table: Unsorted, sorted symbol tables, binary search, hashing, its advantages, disadvantages, Collision, collision resolution techniques: Rehashing, Chaining.

**REFERENCES:**

1. Aho A.V., R. Sethi and J.D. Ullman ,Compiler Principle, Techniques and Tools, Addison Wesley.
2. Barret, Couch, Compiler Construction Theory and Practice, Computer Science series, Asian Student Edition.
3. Dhamdhare D.M Compiler Construction Principle and Practice, McMillan India.
4. Gres D., Wiley ,Compiler Construction for Digital Computer
5. David Galles ,Modern

## CA-9.2 Cloud Computing

### **UNIT – 1 Introduction to Cloud Computing:** [10] [15]

Historical development, Vision of Cloud Computing, Characteristics of cloud Computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers.

### **UNIT – 2 Cloud Computing Architecture:** [8] [10]

Cloud Benefits and Challenges, Market-Oriented Cloud Architecture, SLA-oriented Resource Allocation, Global Cloud Exchange; Emerging Cloud Platforms, Federation of Clouds

### **UNIT – 3 Cloud Management & Virtualization Technology:** [12] [20]

Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions. Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits

### **UNIT – 4 Cloud Security:** [10] [15]

Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture

### **UNIT – 5 Advanced Topics and Cloud Applications:** [10] [15]

Integration of Private and Public Clouds, Cloud Best Practices, the Web on Amazon Cloud, Hosting Massively Multiplayer Games on Cloud, Content Delivery Networks Using Clouds and Hosting Twitter and Facebook on Cloud

### **REFERENCES:**

1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013.
2. Buyya, James Broberg , Andrzej M. Goscinski , Cloud Computing: Principles and Paradigms, Rajkumar, ISBN: 978-0-470-88799-8, Wiley India Publication.
3. Toby Velte, Anthony Velte, Robert Elsenpeter ,Cloud Computing-A Practical Approach, ISBN :0071626948 / 9780071626941 Tata McGraw Hill Publication.
4. Barrie Sosinsky, Cloud Computing bible, Wiley India Pvt Ltd (2011)
5. Kumar Saurabh, ,Cloud Computing, Wiley Publication.
6. Krutz ,Vines, Cloud Security ,Wiley Publication.

## CA 9.3 Mobile Computing (Android)

**Objective:** Familiarize students with Operating Systems for Mobile devices impart skills for Mobile Application Development

**Prerequisites:** Basic concepts of Operating Systems, Programming skills in core Java

### UNIT – 1 An Introduction to Mobile Computing [2] [5]

What is mobile Application Programming?, Different Platforms

### UNIT – 2 Operating systems [3] [5]

Architecture and working of Android, iOS and Windows phone 8, operating system, Comparison of Android, iOS and Windows phone 8

### UNIT – 3 Android Development Environment [5] [10]

What Is Android?, Advantages and Future of Android, Tools and about Android SDK, Installing Java, Eclipse, and Android, Android Software Development Kit for Eclipse, Android Development Tool: Android Tools for Eclipse, AVDs: Smartphone Emulators, Image Editing

### UNIT – 4 Android Software Development Platform [5] [10]

Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project, Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes, Launching Your Application: The AndroidManifest.xml File, Creating Your First Android Application

### UNIT – 5 Android Framework Overview [5] [5]

The Foundation of OOP: The APK File, Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications, Content Providers: Data Management, Android Intent Objects: Messaging for Components, Android Manifest XML: Declaring Your Components

### UNIT – 6 Views and Layouts [5][5]

### UNIT – 7 Buttons, Menus, and Dialogs [5][5]

### UNIT – 8 Graphics Resources in Android [5][5]

Introducing the Drawables, Implementing Images, Core Drawable Subclasses, Using Bitmap, PNG , JPEG and GIF Images in Android, Creating Animation in Android



## **UNIT – 9 Handling UI Events**

**[5][10]**

An Overview of UI Events in Android, Listening for and Handling Events, Handling UI Events via the View Class, Event Callback Methods, Handling Click Events, Touchscreen Events, Keyboard Events, Context Menus, Controlling the Focus

## **UNIT – 10 Content Providers**

**[5][5]**

An Overview of Android Content Providers, Defining a Content Provider, Working with a Database

## **UNIT – 11 Intents and Intent Filters**

**[5][10]**

What Is an Intent?, Implicit Intents and Explicit Intents, Intents with Activities, Intents with Broadcast Receivers

## **REFERENCES :**

- 1 OnurCinar, Beginning Android 4 , ApressPublication
- 2 Reto Meier ,Professional Android 4 Application Development ,WroxPublication
- 3 David Mark , Beginning iOS 6 Development: Exploring the iOS SDK, Apress Publication
- 4 IstvánNovák, ZoltanArvai, GyörgyBalássy and David Fulop Beginning Windows 8 Application Development
- 5 Allen Sanders and Kevin Ashley Professional Windows8 Programming: Application Development with C# and XML, WroxPublication

## CA-9.4 Visual C++ Programming

### **UNIT – 1 Visual C++ Programming – Introduction:** [15] [20]

Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps.

### **UNIT – 2 The Document and View Architecture:** [15] [25]

Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications.

### **UNIT – 3 Active X and Object Linking and Embedding (OLE):** [10] [15]

ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control – ActiveX control container programming – create ActiveX control at runtime – Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications.

### **UNIT – 4 Advanced Concepts:** [10] [15]

Introduction to Graphs and Graph Models, Terminology and Special Types of Graphs, Representations of Graphs, Isomorphism, Connectivity, Euler and Hamiltonian Paths - Shortest Path problems- Planar Graphs- Graph Coloring.

### **REFERENCES:**

1. David J.Kruglinski, George Shepherd and Scot Wingo ,“Programming Visual C++”, Microsoft press, Fifth Ed., 2006 (Unit II – V)
2. Steve Holtzner ,“Visual C++ 6 Programming”, Wiley Dreamtech India Pvt. Ltd., 2003

## CA-9.5 Natural Language Processing

### UNIT-1 [05] [5]

Introduction to NLP, Brief History, challenges/Open Problems, Natural Language (NL) Characteristics and NL computing techniques, NL tasks: Segmentation, Chunking, tagging, NER, Parsing, Word Sense Disambiguation, NL Generation,

### UNIT-2 [05] [10]

Natural Language Processing Applications: Speech to text, story understanding, QA system, Machine Translation, Text summarization, text classification, sentiment analysis, chatterbox, Web 2.0 Applications : Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).

### UNIT-3 [05] [10]

ML basics, algorithms, Naïve Bayes, Bayesian Statistics, HMM, CRF

### UNIT-4 [15] [20]

Word Forms, POS tagging and Chunking: Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields, POS tagging techniques, Chunking techniques: CRF.

### UNIT-5 [10] [15]

Structures : Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; dependency parsing; Hybrid of Rule Based and Probabilistic Parsing: MST, MALT parser; Scope Ambiguity and Attachment Ambiguity resolution.

### UNIT-6 [10] [15]

Meaning : Lexical Knowledge Networks, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Coreferences.

### REFERENCES :

1. Allen, James, Natural Language Understanding, Second Edition, Benjamin/Cumming, 1995.
2. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
3. Jurafsky, Dan and Martin, James, Speech and Language Processing , Second Edition, Prentice Hall, 2008.
4. Manning, Christopher and Heinrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

5. AksharBharti, VineetChaitanya, Rajeev Sangal, Natural Language Processing: An Paninian perspective.

## **CA Lab -17    LAB ON MOBILE COMPUTING**

1. Write Android text based and dialog based program, "Hello world" program.
2. Write Android program for drawing various graphical shapes.
3. Write Android program to demonstrate various UI elements like List Box, Progress bar, Slider control, Popup List, buttons etc.
4. Develop menu based application in Android.
5. Develop form based application in Android.

## CA Lab -18 Lab on Visual C++ Programming

1. Create a SDI application to display size of window & total number of Left clicks, right clicks and double clicks in the center of the client area.
  2. Create a SDI application that displays a dialog box with two field's viz. User name, Password and two push buttons. The dialog box is invoked as the user starts the application. After user pressed on 'OK' button display the contents of username and password in the client area & the password should be in the form of sequences of \*.
  3. Create a SDI application, which invokes a dialog box from a menu option. The dialog box has three scroll bars called red scroll, blue scroll, green scroll and a multiline edit box. As the user scrolls through these scroll bars the background color of the edit box changes.
  4. Create a SDI application that displays a dialog box with five fields: Name, Age (Spinner control.), Qualification it has three check boxes-for MCA, M.Sc., M.Sc.-IT, Radio buttons for Sex & drop down combo box for Designation. As the user fills this information in this dialog box & pressed the 'OK' button. The information is display on the client area. The dialog should be invoked through a Menu option.
  5. Create A SDI Application that invokes a dialog box from a menu called Dialog. The dialog has a track bar slider control, progress bar control and spinner control. As the slides through slider control the progress bar and spinner control should set the status. Display the value of current position set in trace bar.
  6. Create a SDI application and implement modeless dialog box; data of one dialog box should be display in another dialog box when ok button of first dialog is press.
- Note: - Both dialogs should be visible at same time.
7. Create a SDI application to create a dialog box with Multi column list control & display the student information in different columns. Student information: name, seat no, and class, rank should be considered.
  8. Demonstrate splitter window, take Form view and simple view. The data entered in form should be displayed in the sample view.
  9. Create an SDI application that contains an edit box; two buttons viz. Add, Remove & a list box. Whenever user enters a string in the edit box & presses the Add button data should be added to the List box & when remove button is pressed data should be removed.
  10. Write a Program that capture Home, Page Up, Page Down, End & all arrows keys as user presses these keys. Program should display appropriate message in the client window.
  11. Write a SDI application to draw sine wave.
  12. Create a SDI application and create a dialog box with Single Column list box & a tree control. List contains family name and tree control contains family hierarchy. As the user selects an item from the list, selected item of list control entered into the tree control.

13. Create SDI application to Demonstrate Bitmaps. Also change the background color and icon of your application

14. Create a SDI application. Create a access database with a single table of your choice. Fill at least five six records in it. Display the contents of table in the multi column list view.

15. Create a SDI application with the following menu options. Display the selected menu item in the client area. Menu item should have check marks on it when selected.

Cricket ----- Football

One run -----Corner

Four run-----Goal, Sixer-----Penalty Kick

16. Create User defined ActiveX Control and use it in any one application.

17. Create User defined DLL in VC++ and use it in any one application.

## **Semester- X**

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### **CA- 10.1 Full Time Industrial Training**

Three hundred marks shall be awarded to the Industrial Training/Project course, which will commence in X Semester and the final work and report will be completed at the end of X Semester for MCA. The marks will be allotted at the end of X for MCA.