Course Structure And Syllabus for

Bachelor Of Computer Applications (BCA)

(Six Semester Course)

Proposed for 2012 batch onwards

Department of Computer Science
Faculty of Science
St. Joseph's College (Autonomous)

SEMESTER WISE COURSE STRUCTURE

FIRST SEMESTER

Theory				
Sl.No.	**Code**	**Course Title**	**Hrs / Week**	**Credits**
1	-	English	4	4
2	-	Language	4	4
3	CA1112	Probability And Statistics	4	4
4	CA1212	Mathematical Foundation For Computer Science	4	4
5	CA1312	Programming In C	4	4
6	CA1412	Computer Fundamentals And Digital Electronics	4	4
Practicals				
1	CA1P1	C Programming Lab	2	1
2	CA1P2	Pc – Package Lab	2	1

SECOND SEMESTER

Theory				
Sl.No.	**Code**	**Course Title**	**Hrs / Week**	**Credits**
1	-	English	4	4
2	-	Language	4	4
3	CA2112	Data Structures Using C	4	4
4	CA2212	Microprocessors	4	4
5	CA2312	Operating System	4	4
6	CA2412	Computer Oriented Numerical Methods	4	4
Practicals				
1	CA2P1	Data Structures And CONA Lab	2	1
2	CA2P2	Microprocessor Lab	2	1

THIRD SEMESTER

Theory				
Sl.No.	**Code**	**Course Title**	**Hrs / Week**	**Credits**
1	-	English	4	4
2	-	Language	4	4
3	CA3112	OOPS Using C++	4	4
4	CA3212	Visual Programming	4	4
5	CA3312	Database Management Systems	4	4
6	CA3412	Software Engineering	4	4
Practicals				
1	CA3P1	C++ Programming Lab	2	1
2	CA3P2	Visual Programming Lab	2	1

FOURTH SEMESTER

Theory				
Sl.No.	**Code**	**Course Title**	**Hrs / Week**	**Credits**
1	-	English	4	4
2	-	Language	4	4
3	CA4112	UNIX	4	4
4	CA4212	System Programming	4	4
5	CA4312	Computer Graphics	4	4
6	CA4412	Computer Networks – I	4	4
Practicals				
1	CA4P1	UNIX Lab	2	1
2	CA4P2	Computer Graphics Lab	2	1

FIFTH SEMESTER

Theory				
Sl.No.	**Code**	**Course Title**	**Hrs / Week**	**Credits**
1	CA5112	JAVA Programming	4	4
2	CA5212	Multimedia Technology	4	4
3	CA5312	Computer Organization And Architecture	4	4
4	CA5412	Computer Network-II	4	4
Practicals				
1	CA5P1	Java Programming Lab	2	1
2	CA5P2	Mini Project Lab	2	1

SIXTH SEMESTER

Theory				
Sl.No.	**Code**	**Course Title**	**Hrs / Week**	**Credits**
1	CA6112	E-Commerce	4	4
2	CA6212	Object Oriented System Design	4	4
3	CA6312	.NET Technologies	4	4
4	CA6412	Mobile Communications	4	4
Practicals				
1	CA6P1	.NET Programming Lab	2	1
2	CA6P2	Major Project Lab	2	1

THEORY QUESTION PAPER FORMAT

The question papers of the theory examinations should follow the pattern specified below:

Section	Marks for each question	Number Of Questions		Total Marks
		Total	Should Answer	
A	3	10	10	30
B	8	7	5	40
C	10	5	3	30
			Total Marks	100

While selecting the questions importance should be given to all major units.

PRACTICAL QUESTION PAPER FORMAT

Scheme of valuation:

1.	Writing two programs one from each section	10 marks
2.	Execution of one program	20 marks
3.	Formatting the program and output	10 marks
3.	Record verification	05 marks
4.	Viva voce related to practical topics only	05 marks
	Total	50 marks

PROJECT EVALUATION FORMAT

Scheme of valuation:

1.	Demonstration and presentation	25 marks
2.	Documentation	25 marks
	Total	50 marks

INTERNAL ASSESSMENT FORMAT

THEORY:

1.	CIA test	30 marks
2.	First Activity	10 marks
3.	Second Activity	10 marks
	Total	50 marks

PRACTICALS:

Every practical class the student should be assessed.

1.	Writing the observation book	3 marks
2.	Executing the programs	5 marks
3.	Record writing	2 marks
	Total	10 marks

Internal marks for the final semester project work can be awarded by the guide by evaluating the performance of the student during the course of the project work.

FIRST SEMESTER

TITLE: Probability And Statistics
CODE: CA1112
Hrs / Week : 4 Hrs
CREDITS: 4

Probability:
Introduction, Events & Different Types of Events, Addition and Multiplication Law, Conditional Probability, Baye's Theorem. **6 Hrs**

Probability Distribution:
Random Variables, Probability Function, Binomial Poison and Normal Distribution. **4 Hrs**

Statistics:
Definition, Function and Scope of Statistics. **4 Hrs**

Measures of Central Tendency:
Arithmetic Mean, Weighted A.M., Median, Mode, Geometric and Harmonic Mean, their Merits and Demerits. **6 Hrs**

Measures of Variation:
Range, The Interquartile Range or Quartile Deviation, Average (Mean), Deviation Standard Deviation, Coefficient of Variation, Skewness, Moments & Kurtosis. **10 Hrs**

Correlation Analysis:
Introduction, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient, Coefficient of determination. **6 Hrs**

Regression Analysis:
Difference Between Correlation & Regression, Regression Lines, Regression Equations, Regressions Coefficient. Method of least squares. **8 Hrs**

Sampling Distribution:
Chi Square (X^2) Distribution and Its Properties, Chi - Square Test, Application of Chi -Square Distribution: Chi-Square Test for Population Variance, Chi- Square Test of Goodness of Fit, Independence of Attributes, T- Distribution and Its Properties, Application of T - Distribution to Testing Hypothesis About Population Mean, Difference Between Two Means, Correlation Coefficient, F- Distribution. **16 Hrs**

BOOKS:

1. S.P. Gupta & M.P. Gupta, "Business Statistics", Sultan Chand & Sons.
2. S.C. Gupta & V.K. Kapoor ,"Fundamental of Mathematical Statistics", Sultan Chand & Sons.

TITLE: Mathematical Foundation For Computer Science
CODE: CA1212
Hrs / Week : 4 Hrs
CREDITS: 4

Sets, Relations and Functions
Definition of set, intersection, union and compliments. Principal of inclusion and exclusion, De Morgan's laws, cardinality difference, symmetric difference. Cartesian Product, relations. **7 Hrs**

Matrix Theory
Review of fundamentals, equivalent matrices, elementary row (column) operations, rank of a matrix by reducing it to the normal form, rank of a matrix by reducing it to echelon form. **8 Hrs**

Mathematical Logic
Connectives, Negation, Conjunction, Disjunction, conditional, bi-conditional, statement formulas, Tautology and contradiction, Equivalence formulae
Normal forms: Principle conjunctive and disjunctive normal forms, Theory of inferences for statement calculus validating using truth tables. **10 Hrs**

Graph Theory:
Definition of a Graph, Finite and Infinite Graphs, Incidence and Degree of a vertex, Null Graph, Sub graphs, Walks, Paths, Circuits, Connected, Disconnected graphs and Components, Euler Graph, Hamiltonian Path and Hamiltonian Circuits. **10 Hrs**

Trees And Matrix Representation:
Properties of Trees, Distance and Centres in a Tree, Rooted and Binary Trees, Spanning Trees and Fundamental Circuits. Cutset, properties of a Cutset.
Matrix Representation of graphs: Incidence matrix, Circuit matrix, Fundamental Circuit matrix, Cutset matrix, Path matrix, Adjacency matrix **10 Hrs**

Planar and Dual Graphs
Planar Graphs, Kurtowski's two Graphs, Different Representations of a Planar Graph, Detection of Planarity. **7 Hrs**

Directed Graphs:
Definition, Some types of Digraphs, Digraphs and Binary relations, Directed paths and Connectedness, Euler Digraphs, Trees with directed edges, Fundamental Circuits in Digraphs, Adjacency Matrix of a Digraph. **8 Hrs**

BOOKS:

1. Engineering Mathematics by H.C. Das, Chand publications.
2. Graph theory – Narasingh Deo
3. Discrete mathematical Structures by J.P. Trembley and R. Manohar, TMH Publications.
4. Discrete Mathematics by Liu.
5. BCA, Mathematics Vol-II G.K. Ranganath and B. Soorya Narayana.

TITLE: Programming In C
CODE: CA1312
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction To Programming:
Problem Solving Using Computers**:** Language Classification, Problem Analysis, Algorithm and Flowchart design. **Algorithms:** Steps in developing algorithms, advantages and disadvantages. **Flowcharts:** Symbols used in developing flowcharts, advantages and disadvantages. Coding, testing, debugging, Documentation and maintenance. Program development and modular design. **5 Hrs**

Introduction To C Programming:
History, Structure of a C program, C Conventions, Character Set, Identifiers, Keywords, Simple Data types, Modifiers, Variables, Constants, Operators (Arithmetic operator, relational operator, logical operator, ternary operator, unary operator, shorthand operator, bit-wise operator and arithmetic operator) Operator precedence. Input and Output operation: Single character input and output, formatted input and output, Buffered input. **5 Hrs**

Control Structures:
Introduction, Conditional statement, if statement, if-else statement, nested if statement, else-if statement and switch statement. Goto statement. Looping statement, while statement, do-while statement, for statement, break and continue, nested for statement. **10 Hrs**

Arrays:
Introduction (One and two dimensional), Declaration of arrays, Initialization of arrays, processing with arrays. String manipulation, declaration of string arrays, string operations. **9 Hrs**

Functions:
Introduction, advantages of subprograms, Function definition, function call, Actual and formal arguments, local and global variables, function prototypes, types of functions, recursive functions, arrays and functions. **10 Hrs**

Storage Classes, Structures and Unions:
Introduction, types of storage classes, Introduction to structures, Advantages of structures, accessing elements of a structure, nested structures, array of structures, functions and structures, Unions, bit-fields, enumerated data types. **5 Hrs**

Pointers:
Introduction, pointer variable, pointer operator, pointer arithmetic, pointers and arrays, pointers and strings, array pointers, dynamic allocation. **10 Hrs**

Files:
Introduction, File data type, opening and closing a file, file functions (getc, putc, getw, putw, fscanf, fprintf, fread, fwrite, fgets, fputs, feof). **6 Hrs**

BOOKS:

1. Kanetkar, Yashavant: "***Let Us C",*** 4th Edition. BPB Publications.
2. Gottfried, Byron S: "***Programming with C",*** 1996. Tata McGraw-Hill
3. Balagurusamy, E: "***Programming in ANSI C"*** 2nd Edition. Tata McGraw-Hill
4. Deitel, H M and Deitel P J: "***C How to Program",*** 2nd Edition. Prentice-Hall.

TITLE: Computer Fundamentals And Digital Electronics
CODE: CA1412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to computers:
Functional block diagram of a digital computer, Generation of computers, Classification of Computers- Analog, Digital, Hybrid, Micro, Mini, Mainframe computers etc. **3 Hrs**

Hardware:
Input devices - Keyboard, Mouse, Lightpen, Joystick, Scanner, Digitizer.Output devices – Various types of printers, Plotters, Secondary storage devices - Floppy disk, Hard disk, CD-ROM, Optical disk. **3 Hrs**

Software:
Types of software, System software, Operating System, Application Software, Machine Level Language, Assembly language, Higher level programming languages, Assemblers, Compilers and editors. Merits and demerits of all the languages. **2 Hrs**

Representation of Data:
Number Systems, and Inter-conversions among them, Binary arithmetic (Addition, Subtraction, multiplication, division) Binary number system complements- 9's,10's compliments (additions only) 1's and 2's complements and their subtractions, ASCII,Excess-3 code and Gray code, EBCDIC code and BCD code. fixed point representation of numbers, floating-point representation **10 Hrs**

Boolean Algebra and Logic Circuits:
Boolean Algebra Laws and theorems, Gates- AND, OR, NOT,NAND, NOR, EXOR, truth tables, Boolean expressions and their simplifications, SOP & POS-minterm, maxterm & Karnaugh map simplification logic expression. **12 Hrs**

Combinational and Sequential circuits:
Multiplexers, Demultiplexers, Decoders, Encoders, Half Adder, Full Adder, Parallel Adder-subtractor, Flip flops- RS, JK, D, T, Master Slave , Counters-ripple,mod-3,mod-5,mod-10,ring counter, Shift registers. **15 Hrs**

Windows:- Desktop properties, Windows Explorer, Folder Creation, Icon specifications, creating files, creating Shortcuts, deleting, copying and moving files and folders. **5 Hrs**

MS-Word:
Features, Formatting Text, Aligning paragraph and page size, Tab settings. Editing features:- Copy , cur , Paste, Selecting text, undo and redo operations. Clip art and picture editing. Border and shading, Mail merge, Navigation through documents using keyboard and mouse. **4 Hrs**

MS-Excel:
Features, Navigating through work book, work sheet operations- inserting, renaming, copy, cut ,paste and rearranging the order of sheets. Editing cell contents, cell formatting. Formula and function handling. Graph generation for the given range of value. **4 Hrs**

MS-Powerpoint:
Advantages of powerpoint application, types of layouts, types of views in powerpoint. Creating new slides deleting slides. Custom animation, Slide Transition, Applying themes.

2 Hrs

BOOKS:

1. Fundamentals of Computers by Rajaraman, PHI, 1986, 2nd Edition.
2. Digital Computer Fundaments by Thomas C Bartee, McGraw Hill, VI Edition, 1987
3. Computer Organization by Carl Hamacher V. Zaki, McGraw Hill, 1990
4. Digital computer Fundaments by Malvino & Leach.
5. Digital Computer Fundaments by Malvino.
6. Office Automation and word processing – E Balaguruswamy
7. Dummies Series – MS-Office
8. Malvino, **Digital Principles and Applications**, Tata McGraw Hill, 4th Edition
9. M. Ercegovac, T. Lang, J.H. Moreno, **Introduction to Digital Systems**, John Wiley and Sons

PRACTICALS
TITLE: C PROGRAMMING LAB
CODE: CA1P1
Hrs / Week : 2 Hrs
CREDITS: 1

1. Finding the largest, smallest and second largest of three numbers(use simple if).
2. Finding whether a given year is a leap year (use if-else).
3. Finding the roots of a quadratic equation(use nested-if).
4. Calculate Julian date (use switch)
5. Reverse a number (use while)
6. Find whether a number is prime (use while)
7. Convert a decimal number to its binary equivalent and vice versa (use do- while)
8. Find the occurrence of a digit in a number (use do-while)
9. Generate the fibonacci sequence (use for)
10. Find the factorial of a number (use for)
11. Generate the pattern (use nested for)

```
1              1
1 2            2 3
1 2 3          4 5 6
```

14. Sorting a. Bubble b. Selection
15. Searching a. Linear b. Binary
16. Find whether a string is a palindrome.
17. Find whether a given matrix is a lower triangular matrix or upper triangular matrix.
18. Find the sum of the sine and cosine series (use functions).
19. Perform the multiplication of two compatible matrices (use functions).
20. Find x to the power of y using recursion.

TITLE: PC – PACKAGE LAB
CODE: CA1P2
Hrs / Week : 2 Hrs
CREDITS: 1

1. Commands in DOS(Internal and External) and simple exercises on TYPE, REN, DEL, CD, MD, COPY, TREE, BACKUP commands
2. Exercises on entering text and data (Typing Practice)
3 **Features of Windows as an operating system**
   - Start, Shutdown and restore
   - Creating and operating on the icons
   - Opening, closing and sizing the windows
   - Using elementary job commands like
   - Creating, saving, modifying,
   - Renaming, finding and deleting a file
   - Creating and operating on a folder
   - Changing setting like, date, time, color (back ground and fore ground)
   - Using short cuts
   - Using on-line help
4. **MS-Word**

File Management:

Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, Giving password protection for a file

Page Set up:

Setting margins, tab setting, ruler, indenting

Editing a document:

Entering text, Cut, copy, paste using tool-bars

Formatting a document:

Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

- Aligning of text in a document, justification of document ,Inserting bullets and numbering
- Formatting paragraph, inserting page breaks and column breaks
- Use of headers, footers: Inserting footnote, end note, use of comments
- Inserting date, time, special symbols, importing graphic images, drawing tools

Tables and Borders:

Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table

- Print preview, zoom, page set up, printing options
- Using Find, Replace options

Using Tools like:

Spell check, help, use of macros, mail merge, thesaurus word content and statistics, printing envelops and lables

- Using shapes and drawing toolbar,
- Working with more than one window in MS Word,
- How to change the version of the document from one window OS to another
- Conversion between different text editors, software and MS word

5. MS-Excel

Starting excel, open worksheet, enter, edit, data, formulas to calculate values, format data, create chart, printing chart, save worksheet, switching from another spread sheet.

Menu commands:

create, format charts, organize, manage data, solving problem by analyzing data, exchange with other applications. Programming with MS-Excel, getting information while working.

Work books:

Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations, working with arrays

- Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet

Creating a chart:

working with chart types, changing data in chart, formatting a chart, use chart to analyze data

- Using a list to organize data, sorting and filtering data in list
- Retrieve data with MS – query: Create a pivot table, customising a pivot table.

Statistical analysis of data

Customise MS-Excel:

How to change view of worksheet, outlining a worksheet, customise workspace, using templates to create default workbooks, protecting work book

- Exchange data with other application: linking and embedding, embedding objects, linking to other applications, import, export document.

6. MS PowerPoint

Creating slides in power point

SECOND SEMESTER

TITLE: Data Structures Using C
CODE: CA2112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to data structures:

Introduction. Classification of data structures. Analysis of algorithms, space and time complexity, best and worst case, asymptotic notation, upper and lower bounds. **8 Hrs**

Linear data structures:

Introduction, Stacks, Storage representation of stacks, operations on stacks, applications of stacks, queues, operations on queues, circular queues, operations on circular queues, applications of queues and circular queues, polish notation, translation of expression, evaluation of expression. **15 Hrs**

Linked Lists:

Introduction, Singly linked list, operations on linked lists, traversing a linked list, creating a linked list, adding nodes at various positions in a linked list, deletion of nodes, advantages and disadvantages, types of linked lists, applications of linked lists. **15 Hrs**

Trees:
Introduction, terminologies and basic concepts, Binary tree, Storage representation of binary tree, tree traversals, Binary search tree, building a binary search tree, height balanced tree, AVL rotation. **10 Hrs**

Searching and sorting:
Sorting – Bubble sort , Insertion sort, selection sort, quick sort, merge sort.
Searching – Linear and Binary. **12 Hrs**

BOOKS:

1. Data Structure by Schaum Series
2. Fundamentals of Data Structure by Horowitz Sahni
3. Data Structure by Dale and Lilly
4. S. Sahni, **Data Structures**, **Algorithms and Applications**, Tata McGraw Hill,

TITLE: Microprocessors
CODE: CA2212
Hrs / Week : 4 Hrs
CREDITS: 4

Architecture and Operation:
Introduction to 8085, Microprocessor organization / architecture & its operation, memory interfacing, basic interfacing concepts, interfacing I/O devices. **8 Hrs**

Programming the 8085:
Programming model, instruction classification, Instruction format, Addressing modes, writing assembly level programs-overview of instruction set, timing diagrams. Data transfer, Arithmetic, Logic branch operations. Programming techniques - Looping, Counting and Indexing, Additional data transfer and 16 bit arithmetic operations, logic operations, Compare and rotate operations. Counters and Time delays. Stacks and subroutines-conditional CALL and RETURN instructions. Advanced subroutine concepts. Code Conversion- BCD to Binary and Binary to BCD conversions, BCD to 7 segment conversion, BCD addition and subtraction, multiplication and division. **20 Hrs**

Memory Interfacing ,Interfacing I/O Devices:
Memory Interfacing, Memory interfacing circuit. Interfacing Output displays, Interfacing Input devices, peripheral mapped I/O, memory mapped I/O. **7 Hrs**

Interrupts:
8085 interrupts,8085 vectored interrupts, Restart as Software instructions, Additional I / O concepts and processes**.** **7 Hrs**

Interfacing of peripherals (I / Os) and applications:
Interfacing Keyboard (linear and matrix) and 7 segment display including multiplexers, 8279 programmable keyboard/display interface, 8255 PPI, 8259 PIC, DMA and 8257 DMA controller, Interfacing data converters-D to A converters, A to D converters. **18 Hrs**

BOOKS:

1. R.S. Gaonkar - Microprocessor Architecture, Programming and Application with 8085. Penram Int. 3rd Edn.

2. Brey B Brey, The Intel Microprocessor 8086/8088, 80186/80188, 80286, 80386, 80486 Pentium, Pentium Pro. Processor, 6th Edition, Pearson Education.
3. Douglas V. Hall - Microprocessors and digital systems, MH.
4. Kenneth L. Short - Microprocessor and Programmed Logic", PHI, 2nd Edn.
5. Aditya P. Mathur - Introduction to Microprocessors, 3rd Edn. TMH
6. Antonakos: Introduction to Intel family of Microprocessors Pearson Education
7. Hoffer: Modern Systems Analysis and Design Pearson Education
8. Kendall, System Analysis and Design

TITLE: Operating system
CODE: CA2312
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Definition, functions, views, types, Buffering & spooling, multiprogramming, time-sharing, Real time system, protection, operating system structure, system components, system calls. **10 Hrs**

Process Management:
Process concept, functions, Cooperating process, Interprocess communication, Scheduling Criteria, job & processor scheduling. (preemptive & non preemptive) FCFS,SJF,Round Robin algorithms, process synchronization – semaphores, deadlocks - detection and recovery. **15 Hrs**

Memory Management:
Functions, Different schemes-Single continuous-Partitioned -Multiple Relocatable-Paging-Demand paging-Segmentation-Paged segmentation. Virtual Memory management: Demand paging, Page replacement & page replacement algorithm, and thrashing. **15 Hrs**

Device and file system:
Disk structure, allocation methods, free space management, need for disk scheduling, scheduling algorithm, access methods, directory structure, organization, file protections. **10 Hrs**

Case Studies:
DOS and UNIX– Memory Management – overlaying – Extended and Expanded memory – Memory allocation – File system and allocation method – Internal and External commands – Memory management commands – File management commands. **10 Hrs**

BOOKS:
1. Operating System by Milan Milenkovic, McGraw Hill, 1987
2. Operating System by Madnick and Donoval, McGraw Hill, 1974
3. Operating System Concepts by James L Peterson
4. Operating System Design and Implementation by Andrew S Tenenbaum

TITLE: Computer Oriented Numerical Methods
CODE: CA2412
Hrs / Week : 4 Hrs
CREDITS: 4

Computer Arithmetic and Solution of Non-Linear Equations:
Introduction – Floating Point Arithmetic and Errors: Floating point representation of Numbers ,Arithmetic operations with Normalized Floating Point Numbers, Consequences of Normalized Floating Point Representation of numbers. Pitfalls in Computation. Errors in numbers . **10 Hrs**

Solution of Non-Linear equations:
Iterative method, Successive Bisection– Fixed point – Regula falsi – Newton's Raphson – Secant method. **12 Hrs**

Solution of simultaneous Linear Algebraic Equations and ordinary differential equations :
Cramer's Rule.Gauss Elimination method – Pivoting Strategies .Gauss Seidal Iterative Method. **12 Hrs**

Interpolation and Curve Fitting:
Problem of Interpolation – Lagrange's method of Interpolation – Inverse Interpolation – Newton's interpolation formulae – Error of the Interpolating Polynomial - Interpolation at equally spaced points : Forward and Backward differences – Newton's forward and backward difference formulas. Fitting of polynomials and other curve - Least square approximation of functions - linear and polynomial regressions. **14 Hrs**

Numerical differentiation and Integration :
Differentiation based on polynomial fit - Numerical integration using Simpson's rule and Gaussian quadrature formula - Numerical solution of differential equations of the form dy/dx=f(x,y) using Euler's method . **12 Hrs**

BOOKS:

1. Rajaraman,"Computer Oriented Numerical Methods",Prentice-Hall of India Pvt Limited.
2. P.Thangaraj,"Computer Oriented Numerical Methods",Prentice-Hall of India Pvt Limited.
3. N.Datta,"Computer Oriented Numerical Methods",Vikas Publishing House Pvt Limited.
4. S.S.**Sastry** "Introductory methods of Numerical Analysis", Prentice-Hall of India Pvt Limited.

PRACTICALS
TITLE:DATA STRUCTURES and CONA LAB
CODE: CA2P1
Hrs / Week : 2 Hrs
CREDITS: 1

PART A (Data Structures)
1. Array implementation of a stack.
2. Array implementation of a queue.
3. Array implementation of circular queue.

4. Creating a linked list.
5. Adding nodes at various positions in a linked list.
6. Deleting nodes from various positions from a linked list.
7. Creating a binary search tree.
8. Performing the various traversals on a binary search tree.
9. Sorting – insertion, quick, merge, heap, radix
10. Searching – linear and binary search

PART B (CONA)

1. Find the root of a function $f(x)=Ax^3+Bx^2+Cx+D$ by Newton –Raphson method
2. Find the cube root using Newton –Raphson method.
3. Find the solution of simultaneous equations by Gauss-Seidal method.
4. Find the largest Eigen value of a matrix by iteration.
5. Find the roots of an equation by Regular False method.
6. Find the marks obtained by the candidate getting the first rank in a class of n candidates.
7. Using Runge Kutta 4^{th} order method solve dy/dx -y=0 given y (0) =2, h=0.1 find y atx=0.2.
8. Use Taylor's series method, for the equation $dy/dx = x^2y$ and y(1)=1,to find the value of y at x=1.1.Take step size=0.1

TITLE: MICROPROCESSOR LAB
CODE: CA2P2
Hrs / Week : 2 Hrs
CREDITS: 1

1. Exchange of two 16-bit numbers.
2. Addition & Subtraction of two 8-bit HEX numbers.
3. Addition of two 16-bit numbers.
4. Subtraction of two 16-bit numbers.
5. Conversion of hexadecimal to BCD.
6. Block Transfer.
7. Block Transfer in reverse order.
8. 2's Complement of 8 &16 bit number.
9. Largest & smallest number in an Array
10. Checking of +ve, -ve &Zero.
11. Multiplication by successive addition.
12. Frequency of occurance of element.
13. Sum & Average of n-one byte number
14. Square root of a given number.
15. Searching for a number.
16. Addition of two 32 bit numbers.
17. Counting no of ones and zeroes.
18. Sum of odd and even numbers in an array.

THIRD SEMESTER

TITLE: OOPS Using C++
CODE: CA3112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction :
Procedural Languages, definition of OOP, Basic concept of OOP, Object, Class, Data Abstraction, Data Encapsulation, Data Hiding member functions, Reusability, Inheritance, Creating new Data Types, Polymorphism, Overloading, Dynamic binding, and Message passing. **2 Hrs**

C++ Features:
The iostream class, C++ Comments, C++ Keywords, Variable declaration, The Const Qualifier. The Endl, Set W, set precision, Manipulators, The scope resolution operator, new & delete Operators. **2 Hrs**

Functions :
Simple Functions: Function declaration, calling the function, function definition; Passing argument to, returning value from function; passing constants, Variables, pass by value, passing structure variables, pass by reference, Default arguments, return statements, return by reference, overloaded functions; Different number of arguments, Different Kinds of arguments, inline function. **8 Hrs**

Objects and Classes :
Classes & Objects, Class Declaration, Class members; Data Constructors, Destructors, Member functions, Class member visibility; private, public, protected. The scope of the class object constructors; Default Constructor, Constructor with argument, constructor with default arguments, Dynamic constructor, copy constructor, Overloaded constructor, Objects as function arguments; member functions defined outside the class, Objects as arguments, returning objects from functions, class conversion, manipulating private Data members, Destructors, classes, objects & memory, array as class member data, Array of objects, string as class member. **12 Hrs**

Operator Overloading :
Overloading unary operator: Operator Keyword, Operator Arguments, Operator return value, Nameless temporary objects, limitations of increment operator, overloading binary operator, arithmetic operators, comparison operator, arithmetic assignment operator, Data conversion; conversion between Basic types, Conversion between objects & Basic types, conversion between objects of different classes. **12 Hrs**

Inheritance :
Derived Class & Base Class: Specifying the Derived class accessing Base class members, the protected access specifier, Derived class constructor, Overriding member functions, public and private inheritance; Access Combinations, Classes & Structures, Access Specifiers, Level of inheritance; Multilevel inheritance, Hybrid inheritance, Multiple inheritance; member functions in multiple inheritance, constructors in multiple inheritance. **12 Hrs**

Virtual Functions:
Normal member function accessed with pointers, Virtual member functions accessed with pointers, pure virtual functions, Friend function; Friends for functional notation, friend

classes, this pointer; Accessing Member Data with this, using this for returning values. **6 Hrs**

Templates and Exception Handling :
Introduction, Templates, Class Templates, function templates, Member function templates, Template arguments, Exception Handling. **6 Hrs**

BOOKS :

1. Prata : C++ Primer Plus, 4/e Pearson Education
2. Lafore Robert : Object Oriented Programming in Turbo C++, Galgotia Publications
3. Lippman : C++ Primer, 3/e Pearson Education
4. E. Balaguruswamy : Object Oriented Programming with C++, Tata McGraw Hill Publications.
5. Strousstrup : The C++ Programming Language, Pearson Edition, 3rd Edition
6. Kamthane : Object Oriented Programming with ANSI and Turbo C++, Pearson Education
7. Bhave : Object Oriented Programming Using C++, Pearson Education

TITLE: Visual Programming
CODE: CA3212
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Windows Concepts, Objects and events, Define design and development process, Identify elements of IDE, Write, run, save, and print a project, Use online Help. **4 Hrs**

Introduce controls and their properties:
Text boxes, group boxes, check boxes, radio buttons, picture boxes and naming conventions, User friendly features: access keys, default and cancel buttons, tab sequence, Tool Tips, resetting focus, Changing properties at run-time, Concatenate strings. **4 Hrs**

Variables, constants and calculations:
Declaration of variables and constants considering data types and scope, Explicit data type conversions, Perform calculations using arithmetic operators and order of operations, Use of accumulators and counters, Use formatting functions to format output. **4 Hrs**

Decisions and conditions:
Use If statements to control the flow of logic, Use And and/or operators, Call event procedures, Input validation, Debug tools - set break points, stepping and observation of intermediate results. **4 Hrs**

Arrays:
Declare arrays and refer to elements using subscripts, Use For Each/Next statements, Structure Variables, Store data in multidimensional array. **2 Hrs**

Lists, Loops, and Printing:
Create and use list boxes and combo boxes, Use Do/Loops and For/Next statements, Send information to the printer. **2 Hrs**

Menus, procedures and functions:
Create menus and submenus for program control, Write reusable code in sub procedures and sub functions. **6 Hrs**

Toolbars and Status bar:
Creating toolbars, Adding images to toolbars, Writing code to work with toolbars, Creating and using a status bar, Adding panels to the status bar. **4 Hrs**

Other controls:
TabControl, MonthCalendar and Date/TimePicker, Common Dialog (Open/SaveFile), ProgressBar. **4 Hrs**

File handling and file controls in VB: 4 Hrs

Database Connectivity:
Data base basics & database engine, Create a database in Access Through VB, The nature of a relational databases, The data controls (DAO and ADO), Data Bound controls, Working with database objects in code, Data Manipulation through VB – Forms, Develop a database application. **12 Hrs**

Introduction to Graphics and animation: 2 Hrs

Multiple Document Interface (MDI)
Overview of MDI, Creating parent and child forms, Writing code for parent and child forms, Child window management, Creating applications. **4 Hrs**

Creating and using reports:
Printing with windows forms, Data reports, Using Crystal Reports. **4 Hrs**

BOOKS :

1. Deitel, Visual Basic 6 How to Program. Pearson Education
2. Neol Jerke, The Complete Reference Visual Basic 6, Tata McGraw Hill (1999).
3. Evangelas and Petroutsos, Mastering VB 6, 1st Edition, BPB Publications (2001).
4. V.K. Jain, Introduction to OOP and VB, Vikas Publishing House (2003)
5. Gottfried, Programming with Visual Basic, Schaum's Series - Tata McGraw Hill.
6. Reselman, Peasley and Pruchniak, Using Visual Basic 6, PHI (2000).

TITLE: Database Management Systems
CODE: CA3312
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Data, Database, Database management system, Characteristics of the database approach, Role of Database administrators, Role of Database Designers, End Users, Advantages of Using a DBMS and When not to use a DBMS. **6 Hrs**

DBMS Architecture:
Data Models – Categories of data models, Schemas, Instances, and Database state. DBMS Architecture and Data Independence – The Three schema architecture, Data independence. DBMS Languages and Interfaces. Classifications of Database Management Systems. **6 Hrs**

Data Modeling Using Entity-Relationship Model:
Using High Level Conceptual Data Models for Database Design, Example Database applications. Entity types, Entity Sets, Attributes and Keys. Relationships, Relationship

types, Roles and Structural constraints. Weak Entity Types and Drawing E- R Diagrams. **6 Hrs**

Index Structures for Files:
Single Level Ordered Indexes – Primary indexes, Clustering indexes and Secondary indexes. Multi-level indexes, Dynamic Multilevel indexes using B-trees (Introductory concepts). Hashing concepts. **6 Hrs**

Relational Data Model:
Relation, Integrity constraints - domain, entity and Referential integrity constraints, Basic Relational Algebra operations, select, project and join operations. Functional dependencies and Normalization for Relational Databases - Normalization concepts, first, second, third normal forms, Boyce-Codd normal form. **12 Hrs**

SQL:
Queries, sub queries, correlated sub query, views, updation of a database through views, Update, Delete. **4 Hrs**

Transaction Processing Concepts and Concurrency Control Techniques:
Transaction and System concepts – Desirable properties of Transactions – Schedules and Recoverability. Lock-Based Protocols – Locks, Granting of Locks, and Two phase locking protocol and implementation of locking. **6 Hrs**

Data Base Administration:
Introduction to Database security issues, Discretionary Access Control Based on Granting/Revoking of Privileges and Multi-level security. **6 Hrs**

Distributed Databases: Distributed database concepts, Data fragmentation, Replication, and Allocation Techniques for Distributed database design, Types of Distributed database systems. Introduction to Advanced Database concepts – Brief introduction to Data warehousing and Data mining. **8 Hrs**

BOOKS :

1. Elmasri & Navathe, Fundamentals of Database Systems (Fourth Edition), Pearson Education, 2003.
2. Sundarraman, Oracle 9i programming A Primer,1/e Pearson Education.
3. Karate, Introduction to Database Management System, Pearson Education 2004.
4. Abrahamsi. Silberschatag, Henry. F. Korth, S. Sudarshan, Database System Concepts, McGraw hill.
5. Jeffrey. D. Ullman, Principles of database system.
6. Oracle Press: ORACLE - Computer reference
7. C.J. Date, Introduction to database systems, Sixth Edition, Addison Wesley, 1995.
8. Raghu Ram Krishnan, Database Management Systems, Second Edition,. McGraw Hill, 2000.

TITLE: Software Engineering
CODE: CA3412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction :
Software Products and Software process, Process models: Waterfall modal, Evolutionary Development, Bohemia's Spiral model, Overview of risk management, Process Visibility, Professional responsibility. **4 Hrs**

Computer based System Engineering :
Systems and their environment, System Procurement, System Engineering Process, System architecture modeling, Human Factors, System reliability Engineering.
3 Hrs

Requirements and Specification :
The requirement Engineering Process, The Software requirement document, Validation of Evolution of requirements, Viewpoint – oriented & method based analysis, System contexts, Social 7 organizational factors, Data flow, Semantic, Object, models, Requirement definition, Requirement Specification, Non functional requirement. **8 Hrs**

Software prototyping :
Prototyping in software process, Prototyping techniques, User interfaces prototyping. **2 Hrs**

Software Design :
Design Process, Design Strategies, Design Quality, System Structuring, Control models, Modular decomposition, Domain Specific architecture. **5 Hrs**

Object Oriented and function oriented design :
Objects, object Classes and inheritance, Object identification, An object oriented design example, Concurrent Objects, Data flow design, Structural decomposition, Detailed Design, A Comparison of design Strategies. **5 Hrs**

User interface design:
Design Principles, User System interaction, Information Presentation, User Guidance, Interface Evaluation. **3 Hrs**

Software Reliability and reusability :
Software reliability metrics, Software reliability Specification, Statistical testing, Reliability Growth modeling, Fault avoidance & tolerance, Exception handling & defensive programming, Software development with reuse, Software development for reuse, Generator based reuse, Application System Portability. **8 Hrs**

Software Verification and Validation :
The testing Process, Test Planning & Strategies, Black Box, Structural, interface testing, Program inspections, Mathematically based verification, Static analysis tools, Clean room software development. **8 Hrs**

Management Issues : Project management, Quality management, Software cost estimation, Software maintenance. **4 Hrs**

BOOKS :
1. Ian Summerville, Software Engineering, 6th Edition, Pearson Publication Ltd. 2001
2. Roger Pressman, Software Engineering – A practitioner's approach (McGraw Hill).

3. Carlo Ghejgietal, Fundamentals of Software- Engineering, Pearson Education.
4. Panakaj Jalote, An Integrated Approach to Software Engineering – Narosa
5. Publishing house.

PRACTICALS
TITLE: C++ LAB
CODE: CA3P1
Hrs / Week : 2 Hrs
CREDITS: 1

PART A (Program related to C++ concepts)

1. Find the largest and second largest of four numbers.
2. Check whether a given date is valid.
3. Find the GCD and LCM of two numbers
4. Find N C R where $^{N}C_{R}$ = N ! / ((N-R)! * (R!))
5. Generate the fibonacci series using arrays.
6. Interchange the values of two variables using reference variables.
7. Find the factorial of a number using function overloading.
8. Find whether a given number is prime using function overloading.
9. Calculate compound interest using default arguments where CI = P * (1 + R / 100) ^{T}.
10. Check whether a given number is odd or even using inline functions.

PART B (Program related to OOPS concepts)

1. Write a program to create a student database for a class containing Name, Reg No, Class, Combination include the following
   a. Constructors b. Destructors c. Default constructors
   d. Input and Output functions and Input and Output for 5 people using different methods.
2. Create a class to hold information for a customer about his current-account and savings-account in a bank. Using friend functions find the total balance of both the account.
3. Write a program to overload the following operators.
   a. Binary operator ' +' to concatenate 2 strings and compare using '=='
   b. Relational operator ' < ' to find whether one date is less than other.
   c. Find the sum of 2 matrices using operator ' +'
   d. Find the next date of a given date using '++' operator
   e. Using '+'. '-', '*' to find the sum , difference and product of 2 complex numbers
5. Create a base class for a stack and implement push and pop operation. Include derived class to check for stack criteria's such as
   a. Stack is empty b. Stack is full

TITLE: VISUAL PROGRAMMING LAB
CODE: CA3P2
Hrs / Week : 2 Hrs
CREDITS: 1

1. Design an application to validate the user name and password and display message.
2. Design an application to change font style, size, color using a combo box.

3. Design a caculator.
4. Design an application to show usage of timer.
5. Design an application to calculate the area and circumference of a circle.
6. Design an application to find the sum of numbers.
7. Design an application to authenticate travel system using list and combo box.
8. Design an application to add and remove item from list box.
9. Design an application to demonstrate sequential file .
10. Design an application to find the area and perimeter of a square using subroutine.
11. Design an application to create front end and back to implement ADO connection.
12. Design an application to implement crystal report.
13. Design an application to implement arithmetic operation using subroutine.
14. Design an application to implement scroll bar to the change the font size of the label.
15. Design an application to implement Menu Editor.
16. Design an application to move image using timer.
17. Design an application to implement shapes/ images/ pictures.
18. Design an application to implement message box and input box.
19. Design an application to implement if then, if then else conditions.
20. Design an application to implement while, do while.

FOURTH SEMESTER

TITLE: UNIX
CODE: CA4112
Hrs / Week : 4 Hrs
CREDITS: 4

Background and some Basic Commands:
Brief history, Salient features of UNIX system, POSIX and the Single UNIX Specification, The UNIX Architecture, Locating commands, Internal and External Commands, Flexibility of Command Usage, **man:** Browsing and Manual Pages On – line, Understanding the man Documentation. **Cal:** The Calendar, **date:** Displaying and system Date, **echo:** Displaying a message, **printf:** An alternative to **echo, bc:** The Calculator, **Script:** Recording your session, **passwd:** Changing your pass word, **who:** Who are the Users?, **uname:** Knowing your Machine's Characteristics, **tty:** Knowing your Terminal, **sty:** Displaying and setting Terminal Characteristics. **8 Hrs**

The File System and some File Handling Commands:
The File, What's in a (file) name? The Parent – Child Relationship, The HOME Variable: The Home Directory, **pwd:** Checking your Current Directory, **cd:** Changing the Current Directory, **mkdir:** Making Directories, **rmdir:** Removing Directories, Absolute Pathnames, Relative Pathnames, **Is:** Listing Directory continents, The UNIX File System. **Cat:** Displaying and Creating files, **cp:** Copying a File, **rm:** Deleting Files, **mv:** Renaming Files, **more:** Paging Output, The Ip Subsystem: Printing a File, **file:** Knowing the File Types, **wc:** Counting Lines, Words and Characters, **od:** Displaying Data in Octal, The **spell** and **ispell, cmp:** Comparing Two Files, **comm.:** What is Common?, **diff:** Converting One File to other, **dos2unix:** and **unix2dos:** Converting Between DOS and UNIX, Compressing Files, **gzip, gunzip,** and **unzip** commands. **8 Hrs**

File Attributes: Is – I: Listing File Attributes, The – d Option: Listing Directory Attributes, Listing inode number, listing hidden file, time associated with a file, listing timestamps. File ownership, File Permissions, **chmod:** Changing File Permissions, Directory Permissions, changing File ownership. File Systems and Inodes, Hard Links, Symbolic Links and **In,** The

Directory, **umask:** Default File and directory Permissions, Modification and Access Times, **find:** Locating Files. **6 Hrs**

The vi Editor:
vi Basic, Input Mode – Entering and Replacing Text, Saving Text and Quitting – The ex Mode, Navigation, Editing Text, Undoing Last Editing Instructions, (**u** and **U)** Repeating the Last Command (**.**), Searching for a Pattern (**/** and **?**), Substitution – Search and Replace (**:s**), Customizing vi. **6 Hrs**

The Shell:
The Shell's Interpretive Cycle, Pattern Matching – The Wild – cards, Escaping and quoting, redirection: The three Standard Files, /dev/null and /dev/tty: Two Special Files, Pipers, **tee:** Creating a Tee, Command Substitution, Shell variables. **12 Hrs**

The Process:
Process Basics, **ps:** Process Status, System Processes (-eor-a), Mechanism of Process Creation, Internal and External Commands, Running Jobs in Background, **nice:** Job Execution with Low Priority, Killing Processes with Signals, Job Control, fg and bg commands **at** and **batch:** Execute Later, **cron:** Running Jobs Periodically, **time:** Timing Processes. **8 Hrs**

Communication In Unix: finger:
Details of Users, **mesg:** Your Willingness to communicate **write:** communication alternately, **talk:** Online Communication, **wall:** writing on all terminals, **news:** knowledge the local events, Email Basics, The **mail** command. **6 Hrs**

Simple Filters and grep Family of Commands:
The Sample Database, **pr:** Paginating Files, **head:** Displaying the Beginning of a File, **tail:** Displaying the End of a File, **cut:** Slitting a File Vertically, **paste:** pasting Files, **sort:** Ordering a file, **uniq:** Locate Repeated and Non repeated Lines, **tr:** Translating Characters, An Example: Displaying a Word – count List. **Grep:** Searching for a Pattern, Basic Regular Expressions (BRE) – An Introduction, Extended Regular Expressions (ERE) and **egrep.**
6 Hrs

BOOKS:

1. Raymond, The Art of UNIX Programming, Pearson Education, Asia.
2. Glass: Unix for Programmers and Users, 3/e Pearson Education
3. Kernighan: The Unix Programming Environment
4. Kochan: Unix Shell Programming Pearson
5. Venkateshmurthy, Introduction to Unix and Shell Programming, Pearson Education.

TITLE: System Programming
CODE: CA4212
Hrs / Week : 4 Hrs
CREDITS: 4

Background:
Machine Structure, Evolution of the Components of a Programming System., Assembler, Loaders, Macros, Compilers, Formal Systems. **3 Hrs**

Machine Structure, Machine Language and assembly language.: General Machine Structure, Machine Language, Assembly Language. **8 Hrs**

Assemblers:
General Design Procedure, Design of assembler, Statement of Problem, Data structure, Format of databases, algorithm, look for modularity, Table Processing: Searching and Sorting., The problem, Searching a table, linear Search, binary Search, Sorting, interchange sort, Shell Sort, Bucket Sort, Radix Exchange Sort, address calculation sort, comparison of sorts, hash or random entry searching. **10 Hrs**

Macro language and the macro processor:
Macroinstruction, Features of macro facility, Macro instruction arguments, conditional macro Expansion, macro calls within macros, macro instructions defining macros., Implementation, Statement of problem, implementation of a restricted facility, A two pass algorithm. A single pass algorithm, implementation of macro calls within macros. Implementation within an assembles. **10 Hrs**

LOADERS:
Loader schemes, Compile & go, General loading Scheme, absolute loaders, Subroutine Languages, Relocating loaders, Direct linking loaders, other loading Schemes – Binders, linking loaders, Overlays, Dynamic binders. Design of absolute loader., Design of a Direct linking loader, Specification of problem, Specification of data structure, format of data bases ,algorithm. **10 Hrs**

COMPILERS:
Statement of problem, Problem1: Recognizing basic Elements, Problem2: Recognizing Syntactic cutis & interpreting meaning, Problem3: Storage allocation., Problem4: Code Generation. Optimization (machine independent) optimization(machine dependent), Assembly Phase, General model of compiler. **6Hrs**

PHASES OF COMPILERS:
Simple Structure of Compiler, Brief introduction to 7 Phases of Compilers. **3 Hrs**

BOOKS:

1. John J. Donowon , System Programming, TATA McGraw-Hil.
2. Beck: System Software, 3/e Pearson Education
3. Dhamdhere: System programming and Operating System TMH
4. Laudon & Laudon, Management Information Systems, 8/e. Pearson Education

TITLE: Computer Graphics
CODE: CA4312
Hrs / Week : 4 Hrs
CREDITS: 4

Graphics Systems :
Display Devices, Hard Copy Devices, Interactive Input Devices, Display Processors, and Graphic software. **4 Hrs**

Output Primitives :
Points & Lines, Line drawing algorithms, DDA & Bresenham's line algorithms, Circle generating algorithms, Ellipses. Attributes of output primitives, line type, line width, line color, area filling, Scan line algorithm. **8 Hrs**

Two Dimensional Transformations :
Basic transformations, translation , Scaling and Rotation. Matrix representations and homogeneous co-ordinates, composite transformation -translation, scaling and rotations. Raster methods for transformation. **8 Hrs**

Windowing and Clipping :
Windowing concepts clipping algorithms, line clipping, area clipping, Blanking window to view port transformations. **6 Hrs**

Interactive Input Methods :
Physical input devices : keyboards, touch panels, line pens, graphics tablets, joysticks, mouse, trackball, interactive picture construction techniques. **4 Hrs**

Three Dimensional Concepts :
Three–dimensional co–ordinate systems, three–dimensional display techniques, perspective and parallel projections, polygon surfaces, curved surfaces, octrees, three–dimensional transformations. **6 Hrs**

Hidden Surface and Hidden Line Removal:
Back–face removal, depth buffer method, scan line method. **8 Hrs**

Shading and Color Mode : 6 Hrs

BOOKS:

1. Donald Hearn & M.Pauline Baker, Computer Graphics C Version, Pearson Educaiton/PHI
2. Computer Graphics – Steven Harrington, McGH
3. Dr.Venugopal K.R .Syeda Noor Fathima, H.S. Vemala, A programming Approach, programming with Fortran Pascal and C, TMH.
4. Principles of Interactive Computer Graphics – Newman and Sproull,
5. McGraw Hill
6. Graphics Under C – Yeshwant Kanetkar, BPB Publications.
7. James D Foley, Adries Van Dam, Steven K Feiner, John F Hughes, Computer Graphics, Addison Wesley, 1997.
8. Cooley: The Essence of Computer Graphics Pearson Education

TITLE: Computer Networks – I
CODE: CA4412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Uses of Computer networks, network hardware, network software, reference models. **8 Hrs**

The physical layer:
The theoretical basis for data communication, guided transmission media, wireless transmission, communication satilites, the public switched telephone network, the mobile telephone system. **10 Hrs**

The data link layer:
Data link layer design issues, error detection and correction, elementary data link protocols, sliding window protocols, protocol verification. **10 Hrs**

The medium access control sub layer:
The channel allocation problem, multiple access protocols, Ethernet, wireless LAN, broadband wireless, Bluetooth. **10 Hrs**

The network layer:
Network layer design issues, routing algorithms- the optimality principle, shortest path routing, flooding, congestion control algorithms-general principles of congestion control, congestion prevention policies. **10 Hrs**

The transport layer:
The transport service, elements of transport protocols, a simple transport protocol. **6 Hrs**

The application layer:
DNS, electronic mail, the world wide web. **6 Hrs**

BOOKS:

1. Andrew S.Tannenbaum, "***Computer Networks***", Fourth Edition, Tata McGraw-Hill Publishing Company Limited NewDelhi
2. Behrouz A. Forouzan, "***Data Communications and Networking***", TATA Mc-
3. Grow-Hill publications, Second Edition, 2003.
4. William Stallings, "***Data & Computer Communications***", Pearson Education
5. Asia, Sixth Edition, 2001.
6. William A. Shay, "***Understanding Data Communication and Networks***", Vikas Publishing House, Second Edition, 2001.

PRACTICALS
TITLE: UNIX LAB
CODE: CA4P1
Hrs / Week : 2 Hrs
CREDITS: 1

1. Write a shell program for all arithmetic operations.
2. Write a shell program to swap two values.
3. Write a shell program to find the square root of a number.
4. Write a shell program to find the greatest of three numbers.
5. Write a shell program to find the leap year.
6. Write a shell program to check the given number is odd or even.
7. Write a shell program to find the average and grade of five subjects.
8. Write a shell program to find X^Y
9. Write a shell program to generate the series of even numbers from 0 to n.
10. Write a shell program to generate the series of prime numbers.
11. Write a shell program to calculate area of a circle.
12. Write a shell program to check if the given string is palindrome or not.
13. Write a shell program to find the sum of five digit number.
14. Write a shell program to find the factorial of a number.
15. Write a shell program to generate the fibonacci series.
16. Write a shell program to find the length of a string.
17. Write a shell program to find the number of vowels in a string.

18. Write a shell program to reverse a five digit number.
19. Write a shell program to reverse a string.
20. Write a shell program to find the net salary for an employee.

TITLE: COMPUTER GRAPHICS LAB
CODE: CA4P2
Hrs / Week : 2 Hrs
CREDITS: 1

1. Line using (a) DDA algorithm and (b) Bresenham's algorithm
2. Circle using (a) DDA algorithm and (b) Midpoint circle algorithm
3. Write a program showing (a) line styles and (b) area filling.
4. Translation and scaling of a rectangle.
5. Rotation of a triangle:
   (a) With respect to the origin.
   (b) With respect to a pivot point.
6. Reflection of a circle:
   (a) With respect to the origin.
   (b) with respect to X-axis
   (c) with respect to Y-axis
   (d) With respect to the line Y=X.
7. Shearing of a rectangle
   (a) With respect to x axis
   (b) With respect to y axis
8. Vertical histogram.
9. Horizontal histogram.
10. Pie-chart.
11. Write a program to spiral, cardioid, four leaf and limacon.
12. Bezier Curves.
13. Flood fill algorithm.
14. Implementation of Cohen-Sutherland line clipping algorithm.
15. Implementation of Liang Barsky algorithm for line clipping.
16. Implementation of Sutherland-Hodgeman polygon clipping algorithm.
17. Scan-line area filling.
18. Animation- Man walking with an umbrella.

FIFTH SEMESTER

TITLE: JAVA programming
CODE: CA5112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to JAVA:
JAVA Evolution, Overview of JAVA Language: Introduction, Simple Java Program, More of Java, An Application with Two Classes Java Program structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Programming Style. Constants, Variables, and Data Types, Operators and Expressions, Type conversion and Associativity, Mathematical Functions.

Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if …… else Statement, Nesting of if …… else Statements, The else if Ladder, The Switch Statement, The ?: Operator. Decision Making and Looping: Introduction.

The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops. **12 Hrs**

Classes, Arrays, Strings and collection frame work:
Classes, Objects and Methods, Constructors, Methods Overloading, Static Members, Nesting of Methods.

Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays.

Strings and Vectors: Arrays, One – dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, WrapperClasses. **12 Hrs**

Interfaces, Packages, and Multithreaded Programming: Interfaces:
Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. **Packages:** Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. **6 Hrs**

Multithreaded Programming:
Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. **10 Hrs**

Exceptions, Applet Programming:
Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

Applet Programming: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More about Applet Tag, Passing Parameters to Applets, Aligning the Display, More About HTML Tags, Displaying Numerical Values, Getting Input from the Usr. **12 Hrs**

Managing Input / Output Files in JAVA:
Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input/Output Exceptions, Creation of Files, Reading/Writing Characters, Reading/Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes. **8 Hrs**

BOOKS:

1. Shishir Gundavaram, CGI Programming on the World Wide Web, O'Reilly and Associates, (1996). (Chapter 1 – 7)
2. E. Balaguruswamy, Programming with JAVA, A Primer, 2nd Edition., TMH
3. (1999), (Chapter 2 – 16)
4. Thomas Boutel, CGI programming in C and Perl, Addison – Wesley, (1996).
5. Jefry Dwight et al, Using CGI, (Second Edition), Prentice Hall, India, (1997).
6. Darrel Ince & Adam Freeman, Programming the Internet with Java, Addison – Wesley, (1997).

7. KenArnold & James Gosling, The Java Programming Language, Addison – Wesley, (1998)
8. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, 3rd Edition, TMH, (1999).

TITLE: Multimedia Technology
CODE: CA5212
Hrs / Week : 4 Hrs
CREDITS: 4

Multimedia Information Representation:
Introduction, Digitization Principles – Analog Signals, Encoder Design, Decoder Design.
Text: Unformatted Text, Formatted Text, Hyper Text.
Images: Graphics, Digitized Documents, Digitized Pictures.
Audio: PCM Speech, CD – Quality Audio, Synthesized Audio. Video – Broadcast Television, Digital Video, PC Video, Video Content. **15 Hrs**

Text Compression:
Compression Principles – Source Encoder and Destination Decoder, Lossless and Lossy Compression, Entropy Encoding, Source Encoding. Text Compression – Static and Dynamic Huffman Coding, Arithmetic Coding. **10 Hrs**

Continuous Media:
Pcm speech, cd-quality audio, synthesizers, musical instrument digital interface, broadcast television, digital video, pc video. **10 Hrs**

Image Compression:
Graphics Interchange Format (GIF), Tagged Image File Format (TIFF), Digitized Documents, JPEG. **8 Hrs**

Audio Compression:
Differential Pulse Coded Modulation (DPCM), Adaptive Differential PCM (ADPCM), Adaptive Predictive Coding and Linear Predictive Coding, MPEG Audio Coding.
9 Hrs

Video Compression:
Principles, CD, DVD, H.261 Video Compression, MPEG 1, MPEG2 and MPEG 4. **8 Hrs**

BOOKS:
1. Halshall, Fred. "Multimedia Communications – Applications, Networks, Protocols and Standards". 2001. Pearson Education.
2. Chapman, Nigel and Chapman, Jenny. "Digital Multimedia". 2000. John Wily & Sons.
3. Steinmaetz, Ralf and Nahrstedt, Klara. Multimedia : "Comunications and Applications". 2003. Pearson Education.

TITLE: Computer Organization And Architecture
CODE: CA5312
Hrs / Week : 4 Hrs
CREDITS: 4

Digital logic circuits:
Integrated circuits and digital functions:
Digital integrated circuits, IC flip-flops and registers, decoders and multiplexers, binary counters, shift registers, random - access memories (RAM) read-only memories (ROM). **10 Hrs**

Data representation :
Data types, fixed-point representation, floaing-point representation, other binary codes, error detection codes. **6 Hrs**

Basic computer organization and design:
Instruction codes, computer instruction, timing and control, execution and instruction, input-output and interrupt, design of computer. **12 Hrs**

Central processor organization:
Processor bus organization, arithmetic logic unit (ALU), stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, microprocessor organization. **12 Hrs**
Input-output organization:
Peripheral devices, I/O interface, asynchronous data transfer, direct memory access (DMA), priority interrupt, input-output processor (IOP). **10 Hrs**

Memory organization :
Auxiliary memory, microcomputer, memory hierarchy, associative memory, virtual memory, cache memory, memory management hardware. **10 Hrs**

TITLE: Computer Network-II
CODE: CA5412
Hrs / Week : 4 Hrs
CREDITS: 4

Local Area Network:
Features, components of LAN, Benefits of network, LAN evaluation, planning and installing of a LAN. **4 Hrs**

TCP/IP: Origin, Layering, Internet Address, port numbers, DNS, client server model, RFC's services, API, Link layer, SLIP,MTU. **4 Hrs**

Internet Protocol:
IP Header, routing, subnet addressing, masks, ARP Introduction, ARP Cache, ARP Packet format, Proxy ARP, RARP-RARP packet format, server design, ICMP message types, address mask request and reply unreachable code, Time stamp, request and reply, ping program, IP record route option, IP time stamp option, Trace execute program, Trace route program operation, IP source route option. **14 Hrs**

IP and Dynamic Routing:
IP routing: principals, ICMP host and network unreachable errors, ICMP redirect errors, ICMP router discovery messages, Dynamic routing: RIP,OSPF,BGP,CIDR User Datagram Protocol, UDP header, checksum, IP fragmentation, ICMP unreachable error, Maximum UDP datagram size, ICMP source quench error, UDP server design , Introduction to broadcasting and multicasting, DNS: Introduction, basics, message format, query message, resource record, caching. **14 Hrs**

TCP:
Services, header, connection establishment and termination, TCP state transition diagram, Reset segments, simultaneously open and close. TCP Interactive Data Flow: Interactive Input, delayed acknowledgements, Nagle's Algorithm. Bulk Data flow: Normal data flow, sliding window, window size, congestion . Time out and Re-transmission. Round trip time measurement. **12 Hrs**

Telnet and Remote Login:
Introduction, Rlogin protocol, TELNET protocol, FTP: Protocol, data representation, FTP commands, Replies, connection management. SMTP: Protocol, SMTP commands, MIME. NFS: Sun RPC, NFS protocol. **12 Hrs**

PRACTICALS
TITLE: JAVA PROGRAMMING
CODE: CA5P1
Hrs / Week : 2 Hrs
CREDITS: 1

1. To demonstrate the general structure of java language with it's various data types.
2. To accept 5 subject marks through command line arguments , find the average and total of the mark. Display the result in various grades as follows.

Greater than 80 %	outstanding
60 – 80	first class
50 – 60	second class
40 – 50	third class
less than 40	Fail.

3. Create one single dimensional array type of string and display the text in alphabetical order.
4. Generate a multi level inheritance program which used to demonstrate constructor overloading.
5. Generate a java program which shows the difference between static, final,, abstract access modifiers.
6. Create one object array to store minimum 50 students database.
7. Create one interface with all arithmetic operations and implement it to demonstrate Interface implementation.
8. Create one package to operate on all arithmetic operations and import those methods in normal java program.
9. To do the following operations on the given set of strings.
   a)concatenation. b) Comparison c) Character extraction. d)Length of string.
   use string buffer to generate the list of string operations.(any 7 functions)
10. Create a java program to explain multiple try and nested try block statements.
11. Create your own exception to handle the exception when the input value is more than 10.

12. Generate one single thread. a) using Thread class b) using Runnable Interface.
13. To find factorial of list of number reading input as command line argument.
14. To find prime series reading N as command line argument.
15. To sort list of elements in ascending and descending order and show the exception handling.
16. To implement constructor overloading by passing different number of parameter of different types.
17. To create student report using applet, read the input using text boxes and display the o/p using buttons.
18. To calculate bonus for different departments using method overriding.

TITLE: MINI PROJECT
CODE: CA5P2
Hrs / Week : 2 Hrs
CREDITS: 1

Mini Project Lab
Students will be required to pursue a project work allotted to them. This work generally involves solving some practical problem, developing computer programs using the knowledge acquired in the theory and laboratory courses. They will have to submit a report of the work done by them.

SIXTH SEMESTER

TITLE: E-commerce
CODE: CA6112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Electronic Commerce Environment and opportunities: Background. The electronic Commerce environment, Electronic marketplace technology. Modes of electronic commerce: Overview, Electronic Data Interchange (EDI), Migration to open EDI, e-commerce with Internet/WWW, Commerce Net advocacy, Web Commerce going Forward. Approaches to safe e-commerce: Overview, Secure Transport Protocols, Secure Transactions, Secure Electronic Payment Protocol, Secure Electronic Transaction, Certificates, for Authentication, Security on Web Servers and Enterprise Networks. **15 Hrs**

Electronic Payment system:
Electronic Payment systems: Types, Digital Token-Based Electronic Payment Systems, Smart Cards and Electronic Payment Systems, Credit card-based Electronic Payment Systems, Risk and Electronic Payment Systems, Designing Electronic Payment Systems.
10 Hrs

Securing Electronic Transactions :
Introduction, Business Requirements, Concepts, Payment Processing e-mail and Secure e-mail Technologies: Introduction, The means of Distribution. A Model for Message Handling. Working of e-mail. MIME, S/MIME: and MOSS, Comparisons of security methods.
9 Hrs

Applications – 1:
Consumer-Oriented e-Commerce: Applications, Mercantile Process Models, Mercantile Models from the Consumer's Perspective and from the Merchant's Perspective. Interorganizational Commerce and EDI: EDI, Applications of EDI in business, Legal, Security and Privacy Issues; EDI standards and initiatives. EDI Software Implementation, EDI Envelope for Message Transport, Value-added Networks. **12 Hrs**

Applications – II:
Advertising and Marketing: The New Age of Information – Based Marketing, Advertising on the Internet, adaptation of new product: introduction process to the internet Marketing Research. Consumer Search and Resource Discovery: Search and Resource Discovery Paradigms. Information Search and Retrieval, e-Commerce Catalogs or Directories. **14 Hrs**

BOOKS:

1. Deitel, Internet and World Wide Web How to Program, Pearson Education, Asia.
2. Daniel Minoli, Emma Minoli, Web Commerce Technology Handbook, Tata McGraw Hill, (1998) (Chapter 1,2,3,6,7,11)
3. Ravi Kalakota, Andrew B. Whinston, Frontiers of Electronic Commerce, Addison-Wesley, (1996), (Chpater 1,7,8,9,10,11,13,14)
4. Daniel Lynch and Leslie Lundquist, Digital Money: The New Era of Internet Commerce, John Wiley, (1996)
5. Laudon, E-Commerce, Pearson Education, Asia

TITLE: Object Oriented System Design
CODE: CA6212
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
An overview of Object oriented Systems Development: Object Orientation, Object Basics: An Object-Oriented Philosophy, Objects, grouping objects in classes, Attributes; Object Behavior and methods, Encapsulation and Information Hiding, Class Hierarchy, Polymorphism, Object Relationships, and Associations, Aggregations and Object Containment. Object-Oriented Systems Development Life Cycle: Introduction. The software Development Process, Building High Quality software. **9 Hrs**

Methodology Modeling And Uml:
Object Oriented Methodology: Introduction, Rumbaugh et al's Object Modeling Technique, The Booch Methodology, The Jacboson et al methodologies, Patterns. Unified Modeling Language: Introduction, Static and Dynamic Models, UML Diagrams, UML class Diagram, Use Case Diagram, UML Dynamic Modeling, Model Management: Packages And Model Organization, UML Meta- Model **10 Hrs**

Object Oriented Analysis:
Identifying Use Cases: Introduction, Business Object Analysis: Understanding the Business Layer, Use-Case Driven Object - Oriented Analysis: the Unified Approach, Business Process Modeling, Use – Case Model, Developing Effective Documentation, Object Analysis: Classification introduction, Classification Theory, Approaches For Identifying Classes, Noun Phrase Approach, Classes, Responsibilities and Collaborators process, Naming Classes, Identifying Object Relationships, Attributes, and Methods :associations, Super-Sub Class Relationships, A-part-of Relationships-Aggregations, Class Responsibility: Defining

Attributes by analyzing Use Case and other UML Diagrams, Object Responsibility: Methods and messages, **12 Hrs**

Object Oriented Design:
The Object Oriented Design Process, Object Oriented Design Axioms, Corollaries, Design patterns, Designing Classes: The Process, Class Visibility; Designing Well-Defined Public, Private and Protected protocols, Designing Classes: Refining Attributes, Designing Methods and Protocols, Packages and managing Classes, Access Layer: Object Store and Persistence: Database Management systems, Object Oriented Database Management Systems, Object relational systems, View Layer designing Interface Objects: View Layer Classes, Macro-Level Process, Micro level Process. **14 Hrs**

Case Study:
A payroll program: structures approach, object-oriented approach. Case Study:-ViaNet Bank ATM: Identifying actors and use cases for viaNet bank ATM systems-vianet bank ATM systems packages. Case study: relationship analysis for the vianet bank atm system, Case Study: Designing the Access Layer for the ViaNet Bank ATM. Software Quality assurance: Testing Strategies, Test Cases, Test Plan, Continuous Testing, Myers Debugging Principles. **15 Hrs**

BOOKS:

1. Ali Bahrami : Object Oriented Systems Development, McGraw hill,1999.
2. Booch: Object Oriented Analysis and Design Pearson Education
3. Criag Larman: Applying UML and Patterns, an Introduction to Object –Oriented Analysis and Design. Pearson Education 1998
4. Rebecca Wirfs-Brock et al: Designing Object-Oriented software, Prentice-Hall India 1990
5. Grady Booch: Unified modeling Language User Guide, Pearson Education,
6. Gamma: Design patterns: Elements of Reuasable Object Oriented Software , Pearson Education
7. Shalloway: Design Patterns Explained Pearson Education
8. Martin. J. and Odell, J: object oriented methods: a Foundation, Prientice Hall, 1995.

TITLE: .NET Technologies
CODE: CA6312
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to .NET:
.NET Definition, Advantages of .NET, .NET Architecture – Common Language,Runtime, MSIL, Support of different Languages. Language Interoperability, .NET Framework Classes. Advantages of Managed Code – Strong Data Type Check, Garbage Collection, Security, Performance Improvement.

C# Basics:
Features of C# – Data types, Flow Control – the Main method, Program Structure, Methods, Arrays, Namespaces. **12 Hrs**

Object Oriented C#:
Classes and Inheritance, Method Overloading, Method Overriding, Calling Base Versions of Methods. Abstract Classes and Methods, Sealed Classes and Methods. Access Modifiers. Properties – Read Only, Write Only Properties. Function – Parameter Passing Mechanisms. Interfaces, Dispose methods. Operator Overloading, Indexers. **11 Hrs**

Advanced C# Topics:
Errors and Exception Handling, Exception Classes, User Defined Exceptions. The STD namespace objects, Array Lists, Collections, Dictionaries. Multi Threading – Synchronization. Delegates – Definition, Delegates in Inheritance. Event handler, Reflection. **11 Hrs**

Programming in the .NET Environment:
Introduction to Visual Studio .NET – ASP .NET. Difference between ASP and ASP.NET. Creating a Web application using ASP.NET. Components of an ASP.NET User Control, Custom Control, Deploying ASP .NET applications. Master Pages, Themes.

Assemblies:
Features of Assemblies, Application Domains, Assembly Structure, Assembly manifests, Assemblies and Components. **13 Hrs**

Data Access:
ADO.NET overview. Various data access objects – Connection, Command and DataSet Objects. Binding data to ASP .NET server controls. Accessing data from a database using ADO.NET. Reading from and Writing to an XML document, Using XML DOM objects for data access from XML Documents. Binding data from an XML document to Web form controls. Converting data from Database to XML Data. Xml & Web Services. **13 Hrs**

BOOKS:

1. Simon Robinson, Christian Nagel, Karli Watson, Jay Glynn, Morgan Skinner and Bill Evjen, Professional C#, Wiley – dreamtech India Pvt. Ltd., 3rd Edition, 2004.
2. .NET(Core Reference) Microsoft® Visual C#® 2005: The Language by Donis Marshall
3. Complete-reference-to-professional-soa-with-visual-studio-2005-dot-net-3-0
4. Kothari Nikhil and Datye Vandana, Developing ASP .NET Server Controls and Components, Tata McGraw Hill, 2003.
5. Esposito Dino, Applied XML Programming for Microsoft .NET, Tata McGraw Hill, 2003

TITLE: Mobile Communications
CODE: CA6412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
History of wireless communication, A simplified reference model, frequencies for radio transmission, signals, Antennas, signal Propagation, Spread spectrum – DSSS and FHSS, Cellular systems. **12 Hrs**

Types:
SDMA, FDMA, TDMA and CDMA, GSM – Mobile services, system Architecture, Radio interface, Protocols, Localization and Calling, Handover, Security, GPRS. **12 Hrs**

Wireless LAN:
Infrared versus Radio transmission, IEEE 802.11 – system Architecture, Protocol architecture, Physical Layer, MAC Layer, MAC Management, 802.11b, 802.11a. Introduction to Bluetooth – IEEE 802.15. **12 Hrs**

Mobile IP:
Mobile IP – entities and Terminology, IP Packet delivery, Agent discovery, Registration, tunneling, IPV6, Introduction to MANET, TCP over 2.5/3G Wireless Networks. **12 Hrs**

WAP:
WAP (1.x) – Architecture, Wireless Datagram Protocol, Wireless Transport Layer security. Wireless Transaction Protocol, wireless Session Protocol, wireless Application Environment, wireless Markup Language, WML script, Introduction to WAP 2.0. **12 Hrs**

BOOKS :

1. Mobile communications, Jochen Schiller, 2nd edn, Pearson education.
2. Wireless Communication Technology, R. Blake, Thomson Delmar, 2003.
3. Mobile communication engineering: theory and Applications, W. C. Y. Lee, 2nd edn, Mc Graw Hill international Edn, 1998.
4. Wireless digital Communication, Feher, PHI, 199.
5. Principles and Applications of GSM, Vijay K. garg & J. e. Wilkes, Prentice Hall, 1999.

PRACTICALS

TITLE: .NET programs
CODE: CA6P1
Hrs / Week : 2 Hrs
CREDITS: 1

C# Programs

1. To Check whether a number is Palindrome or not.
2. To demonstrate Command line arguments Processing.
3. To find the roots of Quadratic Equation.
4. To demonstrate Operator overloading.
5. To multiply to matrices using Rectangular arrays.
6. To reverse a given string using C#.
7. Use Try, Catch and Finally blocks to demonstrate error handling.
8. Demonstrate Use of Virtual and override key words in C# with a simple program
9. To build a class which implements an interface which is already existing.

ASP.NET Programs
1. Design an application to validate the user name and password and display message.
2. Design an application to change font style, size, color using a combo box.
3. Design a calculator.
4. Design an application to show usage of timer.
5. Design an application to find the sum of numbers.
6. Design an application to add and remove item from list box.
7. Design an application to create front end and back to implement ADO connection.
8. Design an application to implement crystal report.
9. Design an application to implement arithmetic operation using subroutine.
10. Design an application to implement scroll bar to the change the font size of the label.
11. Design an application to implement Menu Editor.
12. Design an application to move image using timer.

TITLE: MAJOR PROJECT
CODE: CA6P2
Hrs / Week : 2 Hrs
CREDITS: 1

Major Project Lab

Students will be required to pursue a project work for an organization of their choice with the permission of the HOD. This work generally involves collecting data, solving and implementing a problem for the organization, developing computer programs using the knowledge acquired in the theory and laboratory courses. They will have to submit a report of the work done by them. Finally a demonstration of the work with the help of a presentation has to be done.