

Syllabus for B.Sc. Computer Science Optional Subject

w.e.f. Academic year 2013-14

Semester	Paper NO	Title of the Paper	No. of Hours per week	Examination Hours	Max Marks	IA	Total
SEM – I	BSCS 1.1	Introduction to Computer Science	5	3	80	20	100
	BSCS 1.2	Computer Lab – I on MS Word, Excel, PowerPoint and Access	4	4	40	10	50
SEM – II	BSCS 2.1	Programming in C	5	3	80	20	100
	BSCS 2.2	Computer Lab – II Based on BSCS 2.1	4	4	40	10	100
SEM – III	BSCS 3.1	Data Structures Using C	5	3	80	20	100
	BSCS 3.2	Computer Lab – III Based on BSCS 3.1	4	4	40	10	50
SEM – IV	BSCS 4.1	OOPs Using C++	5	3	80	20	100
	BSCS 4.2	Computer Lab – IV Based on BSCS 4.1	4	4	40	10	50
SEM – V	BSCS 5.1	Mathematical Foundation for Computer Science	3	3	80	20	100
	BSCS 5.2	Visual Programming	3	3	80	20	100
	BSCS 5.3	Computer Lab – V on Numerical Methods & BSCS 5.1	4	4	40	10	50
	BSCS 5.4	Computer Lab – VI on Visual Basic	4	4	40	10	50
SEM VI	BSCS 6.1	JAVA & Internet Programming	3	3	80	20	100
	BSCS 6.2	Data Base Management System	3	3	80	20	100
	BSCS 6.3	Computer Lab – VII Based on BSCS 6.1	4	4	40	10	50
	BSCS 6.4	Computer Lab – VIII Based on SQL	4	4	40	10	50

First Semester B.Sc.(Computer Science as one of the optional Subjects)

w.e.f. Academic year 2013-14

BSCS 1.1 : Introduction to Computer Science

Total Teaching Hours : 50

Unit – 1: Introduction: History & Evolution of Computers. Characteristics. System logical Organization, Von - Neumann concept of computer with block diagram : Components of Computer & their functions. Generations of Computers. Types of Computers. Input Devices, Output Devices, Storage Devices.

5 Hours

Unit – 2: Processor & Main Memory : Central Processing Unit: ALU & CU. Architecture of Processor & Main Memory Processor Registers. Types of Processors. Main Memory: Organization of Main Memory, Main Memory Capacity. RAM, ROM, PROM, EPROM, EEPROM, Cache Memory.

8 Hours

Unit - 3: Number System: Decimal, Binary , Octal & Hexadecimal Number Systems and their conversions. Data representation: Computer Codes : Morse Code, BCD,EBCDIC, ASCII and Unicode , Binary Arithmetic.

6 Hours

Unit – 4 : Boolean Algebra & Logic Gates : Fundamental concepts of Boolean Algebra with Truth Tables. Postulates & Laws of Boolean Algebra. Principle of Duality. Logic Gates: AND, OR, NOT, NAND and NOR Gates with logic symbol & Truth Table. Logic Circuits with simple examples.

6 Hours

Unit – 5: Computer Software: Types of Software: System Software & Application Software. Operating System: Functions & Types. Compiler, Linker, Loader and Editor. Computer Languages: Machine Level, Assembly Level & High Level, Their Merits & Demerits. Planning a Computer Program: Algorithm, Flowchart and Pseudo code

8 Hours

Unit – 6 : Data Communication & Computer Networks : Elements of Data communication system: Sender, Receiver and Medium. Transmission Modes: Simplex, Half-Duplex and Duplex. Transmission media: Twisted Pair, Coaxial Cable, Optical Fiber Cable, Satellite Communication. Switching techniques: Circuit Switching, Packet Switching and Message Switching. Types of Networks. Network Topologies. OSI Reference Model

12 Hours

Unit – 7 : Internet : History & Architecture of Internet, Applications, Internet Access, Addressing, Web Browsers, Search Engines, URL, WebPages, Websites, HTML. Internet Services: WWW, Email, TELNET, Instant Messaging, Social Networking & Cloud Computing.

5 Hours

## BSCS 1.2 : Computer Lab – I

Based on MS Word, MS Excel, MS PowerPoint and MS Access.

### Sample Programs:

1. Create an Invitation card in MS Word.
2. Create a Certificate in MS Word with college name curved.
3. Create a mail- merged document.
4. Create a worksheet to calculate Simple Interest and the amount to be paid. Insert at least 6 rows. Make it interactive so that user can enter the rate of interest.
5. Create a worksheet to illustrate Mathematical & Trigonometric functions:  $\sin x$ ,  $\cos x$ ,  $\tan x$  and  $\log x$ . Insert line chart for sine & cosine curves.
6. Create marks sheet of 10 students. Use IF clause to display the results. Insert data validation & conditional formatting
7. Create a worksheet to solve the quadratic equation  $ax^2 + bx + c = 0$  using graphical method (line chart). Make it interactive so that user can enter the values of a,b,c.
8. Create a worksheet to prepare shopping bill in a shop. Customer gets discount of 15% of the bill amount, if bill amount > Rs.25,000; 10% , if bill amount is between Rs.15,000 & 25,000 and 5 % , if bill amount is between 5,000& 15,000. Add 4 % VAT on the net amount.
9. Create a presentation to explain the parts of computer. Insert at least 5 slides along with a welcome slide and concluding slide. Insert appropriate pictures. Insert animation and transition effects for each slide. Each slide should have footer, date & time.
10. Create a presentation using Auto content Wizard or Installed Templates.
11. Create a presentation to illustrate hyperlinks to open an audio, video, image , word files and chart in another slide.
12. Create a student data base with Rollno, Sname, Class, Gender, Caste and Birth date. Use lookup wizard for Gender & Caste. Enter at least 10 entrees. Create a query to display the name, class and caste of SC / ST students. Create a form to view , add & delete the data
13. Create a student database with USN, Sname, Course, Semester, Subject Combination and Percentage. Use lookup wizard for combination and course. Enter at least 10 rows. Create a query to display PMCS students who have scored more than 75% . Create a form to view , add & delete the data
14. Create an Employee database with empno, ename, designation, join\_date, marital status and salary. Use check box for the field marital status. Enter the details of at least 10 employees. Create a query to display the name, designation and salary of all the employees whose designation is CLERK. Create a form to view , add & delete the data
15. Create a Book database with Book\_ID, Category, Title, Author, Publisher and Price. Use look up wizard to have Category as text, novel, fictions or stories. Enter the details of at least 10 books. Create a query to display the details of all the text books. Create a form to view , add & delete the data

Note : A minimum of 20 assignments should be done by each students.

Reference Books :

1. P. K. Sinha & Priti Sinha :Computer Fundamentals (BPB)
2. V. Rajaraman : Computer Fundamentals
3. Moris mano: Computer Organization & Architecture
4. Malivno & Leach : Digital Principals & Applications(TMh)
5. Thomas Bartee: Digital Computer Fundamentals(TMh)
6. Tanenbaum : Computer Networks(Pearson Education)
7. Alberto Leon Garcia: Communication Networks(TMh)
8. Forouzan: Data Communications & Networking(TMh)
9. Norton : Computer Applications

BSCS 2.1 : Programming in C

Total Teaching Hours : 50

Unit 1: Over View of C: Introduction. Importance and Features of C. Structure of a C Program. Sample C Programs. Creating and Executing a C Program. Block diagram of execution of C program.

4 Hours

Unit 2 : Basic Concepts : C Character Set. C tokens: keywords, identifiers, constants and variables. Data types. Declaration & initialization of variables. Symbolic constants.

5 Hours

Unit 3 : Managing input output: Formatted i/o functions: *printf* and *scanf*: control stings and escape sequences, output specifications with *printf* functions. Unformatted i/o functions to read and display single character and a string: *getchar*, *putchar*, *gets* and *puts* functions.

5 Hours

Unit 4 : Operators & Expressions : Arithmetic operators, Relational operators, Logical operators, Assignment operators, increment & decrement operators, bitwise operators, conditional operator and special operators. Computational Problems, Operator Precedence and Associativity. Evaluation of arithmetic expressions, Mathematical functions. Type conversion

5 Hours

Unit 5 : Control Structures (Branching & Looping) : Decision making with *if* statements: *simple if*, *if \_ else* statements, *nested if \_ else* and *else\_if ladder*. *Switch case* Statement. *goto*, *break* & *continue* statements. Looping Statements : *while*, *do-while* & *for* loops. Nested loops

8 Hours

Unit 6 : Arrays and Strings: One Dimensional arrays: Declaration, Initialization and Memory representation. Two Dimensional arrays : Declaration, Initialization and Memory representation. Declaring & Initializing string variables. String handling functions: *strlen*, *strcmp*, *strcpy* and *strcat*. Character handling functions: *tolower*, *toupper*, *isalpha*, *isnumeric* etc.

8 Hours

Unit 7 : User Defined Functions: Need for user defined functions. Format of C user defined functions. Components of user defined functions: return type, name, parameter list, function body, return statement and function call. Categories of functions : with or without return types and parameters. Nesting of functions. Recursive functions. Functions with arrays.

5 Hours

Unit 8 : Pointers : Understanding pointers. Declaring and initializing pointers, accessing address and value of variables using pointers. Pointer and array. Pointer Arithmetic. Advantages and disadvantages of using pointers

Unit 9 : User defined data types : Enumerated data types. Typedef Statements. Structures & Unions: Structure Definition. Advantages of Structure. Declaring structure variables. Accessing structure members. Structure members initialization. Comparing structure variables. Array of Structures. Union Definition. Difference between structure and union.

#### References :

1. E. Balguruswamy: Programming in ANSI C ( TMH)
2. Kamthane : Programming with ANSI and TURBO C(Pearson Education)
3. V. Rajaraman : Programming in C (PHI – EEE)
4. S. ByronGottfried: Programming with C (TMH)
5. Kernighan & Ritchie : The C Programming Language.(PHI)
6. Yashwant Kanitkar : Let us C
7. P.B. Kottur : Programming in C (Sapna Book House)

#### BSCS 2.2 : Computer Lab – II Based on BSCS 2.1

#### Sample Programs:

1. Write a C Program to check for prime
2. Write a C Program to generate n primes
3. Write a C Program to check a number for palindrome
4. Write a C Program to generate n Fibonacci numbers
5. Write a C Program to read numbers from key board continuously till the user presses 999 and to find the sum of only positive numbers.
6. Write a C Program to find a length of a string without using built in function
7. Write a C Program to read string, reverse it and check it for palindrome.
8. Write a C Program to find GCD and LCM
9. Write a C Program to find the roots of quadratic equation.
10. Write a C Program to read, display and to find the trace of a square matrix
11. Write a C Program to read, display and add two m x n matrices using functions
12. Write a C Program to read, display and multiply two m x n matrices using functions
13. Write a C Program to find factorial of a number using both iterative & recursive function.
14. Write a C Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.
15. Write a C Program to demonstrate student structure to read & display records of n students.

Note : A minimum of 20 assignments should be done by each students.

Total Teaching Hours : 50

Unit 1. Introduction to data structures : Definition. Classification of data structures : primitive & non primitive. Operations on data structures : insert, delete, search  
(2 Hours)

Unit 2. Dynamic memory allocation : Meaning of static & dynamic memory allocation. Memory allocating and de-allocating functions: *malloc, calloc, realloc* and *free*  
(4 Hours)

Unit 3: Files: Introduction: Types of files : Binary and Text files. Concept of file pointer & EOF. Basic file operations : opening a file, closing a file. File I/O operations :writing into the file and reading from the file:*fopen, fclose, fprintf, fscanf, getc, putc, getw, putw*. Error handling functions : *feof, ferror*. File pointer positioning functions : *ftell, fseek* and *rewind*.  
( 4 Hours)

Unit 4 : Recursive functions: Definition. Types of recursion: Direct & Indirect. Execution of recursive programs : Fibonacci numbers, GCD, Binomial coefficient  ${}^nC_r$  , Towers of Hanoi.  
(4 Hours)

Unit 5 : Sorting : Definition. Types of sorting: Internal & External sorting . Different Internal sorting Techniques: Bubble sort, Selection sort, Quick sort, Insertion sort, Merge sort, Binary tree sort and Heap sort. Searching : Basic search Techniques : Sequential search & binary search- Iterative & Recursive Methods. Comparison between sequential & binary search.  
(10 Hours)

Unit 6 : Stack : Definition. Representation of stack using array. Operations on Stack. Applications of stacks : Infix, postfix and prefix notations. Conversion from infix to postfix using stack. Evaluation of postfix expression using stack. Application of stack in function calls. Queue : Definition. Representing queue using array. Operations on simple queue. Types of queue :Simple queue, circular queue, double ended queue(dqueue) and priority queue.  
(10 Hours)

Unit 7 : Linked List : Definition, Components of Linked List. Advantages & disadvantages of linked list over arrays. Types of linked list : Singly linked list, doubly linked list, circular linked list and circular doubly linked list. Operations on Singly linked list.  
(8 Hours)

Unit 8 : Tree : Introduction : Definition. Concepts of binary tree, strictly binary tree, complete binary tree, binary search tree and heap tree. Tree terminologies: root node, parent node, ancestors of a node, siblings, terminal & non terminal nodes, degree of a node. Level, Edge,

Path and depth. Binary tree : Array representation of binary tree. Traversal of binary tree: *preorder*, *inorder* and *postorder* traversal. Reconstruction of a binary tree when any two of the traversals are given.

(8 Hours)

Reference Books :

1. Tanenbaum : Data structures using C (Pearson Education)
2. Kamathane : Introduction to Data structures (Pearson Education)
3. Y. Kanitkar : Data Structures Using C (BPB)
4. Kottur: Data Structure Using C
5. Padma Reddy : Data Structure Using C

### BSCS 3.2 : Computer Lab – III Based on BSCS 3.1

1. Write a C program to implement array operations insert, delete, reverse and display.
2. Write a C program to read the marks scored by n students and to find the first 3 highest marks without sorting the list.
3. Write a C program to implement dynamic array, find smallest and largest element of the array.
4. Write a C program to read the names of cities and arrange them alphabetically.
5. Write a C program to sort the given list using selection sort technique.
6. Write a C program to sort the given list using bubble sort technique.
7. Write a C program to sort the given list using insertion sort technique.
8. Write a C program to sort the given list using quick sort technique.
9. Write a C program to sort the given list using merge sort technique.
10. Write a C program to search an element using linear search technique.
11. Write a C program to search an element using recursive binary search technique.
12. Write a C program to implement Towers of Hanoi.
13. Write a C program to display Pascal Triangle .
14. Write a C program to find the value of  $e^x$  up to four decimal places using infinite series
15. Write a C program to implement Stack.
16. Write a C program to implement simple queue.
17. Write a C program to implement circular queue
18. Write a C program to implement linear linked list.
19. Write a C program to create two files to store even and odd numbers.
20. Write a C program to create a file to store student records.
21. Write a C program to convert Infix expression to Postfix expression.
22. Write a C program to display traversal of a tree.

Note : A minimum of 20 assignments should be done by each students.



Fourth Semester B.Sc.(Computer Science as one of the optional Subjects)

BSCS 4.1 : Object Oriented Programming Using C++

Total Teaching Hours : 50

Unit 1 : Introduction : Procedural languages. Definition of OOP. Basic concepts of OOPs : Object, Class, Data Abstraction, Data Encapsulation, Data Hiding, Inheritance, Polymorphism, dynamic binding and message passing

(2 Hours)

Unit 2 : Introduction to C++: C++ Features: The stream classes, *cin* & *cout* objects, C++ comments, the const qualifier, manipulators : *endl*, *setw*, *setprecision*. The scope resolution operator, new & delete operators.

(4 Hours)

Unit 3 : User Defined Functions : Function declaration. Function definition. Function calling. Parameters passing techniques: pass by value, pass by reference. Default arguments. Function overloading. Inline functions.

(6 Hours)

Unit 4 : Objects & Classes : Definition of Objects & Classes. Class declaration. Class members : data members & member functions. Declaring member functions inside the class & outside the class. Declaring object of a class. Accessing member functions & data members using objects. Class member visibility with access specifiers- private, public & protected. Memory representation for objects & member functions. Constructors : Types of constructors: Default constructors, Constructors with arguments, Overloaded constructors, constructors with default arguments, Dynamic Constructors and Copy constructors. Destructors. Objects as arguments, returning an object. Array of Objects. Friend functions.

(12 Hours)

Unit 5 : Operator Overloading : Definition. The operator keyword. Syntax of overloading unary operators & binary operators. Examples of overloading Arithmetic operators, comparison operators and increment operators. Limitation of overloading increment operators. Operator overloading using friend functions. Overloading of insertion & extraction operators. Data Conversion : Conversion between basic data types, Conversion between objects & basic data type & Conversion between objects of different classes. Nameless temporary objects. The this pointer. Accessing data member and returning values using this pointer.

(8 Hours)

Unit 6 : Inheritance : Definition. Base Class & Derived Class. Public and Private inheritance. Accessing base class members in derived class with access modes private, protected and public. Types of inheritance : Simple inheritance, Multilevel inheritance, Multiple Inheritance, Hybrid inheritance and Multipath inheritance. Constructors and destructors in simple inheritance Member function overriding. Class within a class. Containership. Friend classes.

( 8 Hours)

## Reference Books:

1. Venugopal : Mastering C++ (TMH)
2. E. Balguruswamy : Object Oriented Programming with C++ (TMH)
3. Lipman: C++ Primer (PE)
4. Shildt: Complete Reference C++ (TMH)
5. Kamthane : Object Oriented Programming with ANSI & Turbo C++
6. Padma Reddy: Programming in C++

## **BSCS 4.2 : Computer Lab IV Based on BSCS 4.1**

### Sample Programs:

1. Write a C++ program to illustrate default arguments.
2. Write a C++ program to illustrate inline function.
3. Write a C++ program to illustrate function overloading.
4. Write a C++ program to prepare electricity bill.
5. Write a C++ program to prepare shopping bill.
6. Write a C++ program to illustrate bank transactions.
7. Write a C++ program to implement stack operations.
8. Write a C++ program to implement queue operations.
9. Write a C++ program to add two distance variables.
10. Write a C++ program to add two time variables.
11. Write a C++ program to concatenate two strings by overloading + operators.
12. Write a C++ program to compare two strings by overloading =, < and > operators.
13. Write a C++ program to read, display and add two complex numbers using operator overloading.
14. Write a C++ program to read, display and multiply two complex numbers using operator overloading.
15. Write a C++ program to prepare student report using simple inheritance technique.
16. Write a C++ program to swap two objects using friend functions.
17. Write a C++ program to find the maximum of two objects using friend functions.
18. Write a C++ program to sort the list of elements using function templates.
19. Write a C++ program to read, display and add two mxn matrices using operator overloading.
20. Write a C++ program to read, display and multiply two mxn matrices using operator overloading

*Note : A minimum of 20 assignments should be done by each students.*

BSCS 5.1 : Mathematical Foundation for Computer Science

Total Teaching Hours : 50

Unit 1 : Fundamental Principle of Counting : The rule of sum and product. Permutations, combinations, The binomial theorem, Combination with repetitions.

(5 Hours)

Unit 2 : Fundamentals of Logic : Basic conventions & Truth tables. Logical equivalence. Tautology and Contradiction. The laws of Logic. Logical implication. Valid arguments, Rules of Inference. Predicates. Existential & Universal Quantifiers. Definitions and Proofs of theorems.

(10 Hours)

Unit 3: Set Theory : Concept of Sets subsets. Set operations. Laws of set theory. Counting principle with Venn diagrams.

(5 Hours)

Unit 4 : Properties of Integers : The Well Ordering principle. Mathematical Induction. The division algorithm. Prime numbers, Euclid's theorem on primes. Euclid's algorithm on GCD. The fundamental Theorem on Arithmetic. Recursive definitions.

(10 Hours)

Unit 5 : Relations & functions: Cartesian Product. Relations, functions. One-one & onto functions. Stirling numbers of second kind. The pigeon hole principle. Computational Complexity. Analysis of Algorithms.

(10 Hours)

Unit 6 : Statistical Methods : Basic concepts of statistics. Frequency distribution table. Measures of central tendency : mean, median & mode. Measures of dispersion : standard deviation. Coefficients of skewness kurtosis. Correlation: Karl Pearson's coefficient of correlation. Rank correlation coefficient. Probability : Basic concepts of probability. Definition of probability. Axioms on probability. Addition law of probability. Conditional probability. Multiplication law of probability. Bayes theorem and its application.

(10 Hours)

References Books:

1. Grimaldi & Raman: Discrete & Combinatorial Mathematics(Pearson Education)
2. Gupta & Kapoor: Fundamentals of Mathematical Statistics
3. Y.P. Agarwal: Statistical Methods, Applications & Computations.
4. Kolman, Busby & Ross: Discrete Mathematical Structures (TMH)
5. C. L. Liu : Elements of Discrete Mathematics (Pearson Education)
6. Golden Series :Statistical Methods
7. Richard Baugh: Discrete Mathematics (Pearson Education)

### BSCS 5.3 : Computer Lab V Based on BSCS 5.1

#### Sample Programs:

1. Write a program to find a root of  $f(x) = 0$  using Bisection method
2. Write a program to find a root of  $f(x) = 0$  using Newton Rapson method
3. Write a program to find a root of  $f(x) = 0$  using Regula Falsi method
4. Write a program to find a root of  $f(x) = 0$  using Iteration method
5. Write a program to calculate mean & median for ungrouped data
6. Write a program to calculate mean & std-deviation for ungrouped data
7. Write a program to calculate mean & std-deviation for grouped data
8. Write a program to calculate Karl Pearson's correlation coefficient
9. Write a program to calculate Karl Pearson's rank correlation coefficient
10. Write a program to find first n Fibonacci & Lucas numbers
11. Write a program to fit a linear curve  $y = ax + b$
12. Write a program to integrate  $f(x)$  between a & b using Trapezoidal rule
13. Write a program to integrate  $f(x)$  between the limits a & b using Simpson's  $\frac{1}{3}$ <sup>rd</sup> rule
14. Write a program to integrate  $f(x)$  between the limits a & b using Simpson's  $\frac{3}{8}$ <sup>th</sup> rule
15. Write a program to display Sterling's numbers of second kind.
16. Write a program to interpolate the value of y, for a given value of x, using Lagrange's Interpolation Formula.
17. Write a program to interpolate the value of y, for a given value of x, using Newton's Forward Interpolation Formula.
18. Write a program to solve a set of equations using Gauss-Siedal iteration method
19. Write a program to solve a set of equations using Gauss – Elimination
20. Write a program to solve a set of equations using Gauss – Jordon method

Note : A minimum of 20 assignments should be done by each students.

Fifth Semester B.Sc (Computer Science as one of the optional Subjects)

BSCS 5.1: Visual Programming.

Total Teaching Hours : 50

Unit 1:

The Integrated Development Environment -Menu Bar, Tool Bar, Form Designer, Code Window, Project Explorer, Properties Windows, Form Layout Window, Tool Box. The Form Object: Properties-Name, Caption, Backcolor, Borderstyle, Controlbox, Maxbutton, Minbutton, Moveable, Startup Position, Height, Width, Left, Top, Scalemode, Window State. Form Events- Load, Unload, Click, Activate, Deactivate, Paint, Resize. Methods- Show, Hide, Cls, Unload, Print, Graphics methods. Controls-Common Properties and unique properties and Events of Command Button, Labels, TextBoxes, Image, Timer, Scrollbars, Option Button, Check Boxes, Frames, Lists And Combo Boxes. MsgBox and InputBox.

(25 Hours)

Unit 2: Programming In VB: Data Types, Variables, Declaration and Scope, Form modules And Code Modules, Private And Public Procedures, Main() Procedure, Subs And Functions. Mathematical and String Functions. Control Structures: Branching and Looping. Arrays: Declaration, Static and Dynamic Arrays, Control Array. Working with Menu Editor, Common Dialog Box, Designing Multiple Document Interface Forms, Creating toolbars using Microsoft Windows Common Controls.

Database Connectivity.DAO, ADO & RDO. File handling & Error handling in VB, DLL Files, ActiveX Controls, Windows API.

(25 Hours)

Reference Books :

1. Jerke: Complete Reference Visual Basic 6.0 (TMH)
2. Mohammed Azam : Visual Basic 6.0
3. Deital : Visual Basic 6. How to Program(Pearson Education)
4. Petroustos: Mastering Visual Basic (BPB)

## BSCS 5.4 : Computer Lab V Based on Visual Basic

### Sample Programs;

1. Build a VB application to validate username & password and to display the appropriate message
2. Build a VB application to change the font, font color, font size and font style of a text using combo box control
3. Build a VB application to illustrate mathematical calculator using control array
4. Build a VB application to change the color of the form using scroll bar controls
5. Build a VB application to illustrate screen saver
6. Build a VB application to move an image using timer control
7. Build a VB application to illustrate MDI form menu editor to draw geometrical figures.
8. Build a VB application to establish database connectivity
9. Build a VB application to convert numbers from figures to words( 1 to 1000)
10. Build a VB application to demonstrate text encryption & decryption
11. Build a VB application to display a message at the center of the form. Form's back color and fore color has to be changed randomly
12. Build a VB application to display a message throughout the form. Form's back color and fore color has to be changed randomly
13. Build a VB application to scroll a message from right to left which is displayed on the label control.
14. Build a VB application to accept only the numbers with fractional part in a text box
15. Build a VB application to convert a character to ASCII and ASCII to character. Use option buttons
16. Build a VB application to display a circle with four different colors
17. Build a VB application to draw geometric figures using graphic methods.
18. Build a VB application to display a chess board throughout the form.
19. Build a VB application to display digital clock on the label.
20. Design a VB application to create a Note pad using Menu Editor and Toolbar control.

*Note : A minimum of 20 assignments should be done by each students.*

BSCS 6.1: Java & Internet Programming

Number of Teaching Hours : 50

Unit 1. Java: History, Features, JDK. Program: Java Standalone Application Program (JSAP), Applet, Structure of JSAP, Java Virtual Machine (JVM), Tokens: Reserved word, Identifiers, Literals. Operators: Arithmetic, Logical, relational, Assignment, Conditional, Bitwise. Data Types: primitive and Non-Primitive, Variables. Program: Control Structure: Branching: If, If-else, nesting if, if-else ladder, Looping: for, while & do. Type Conversion: Conversion & Casting.

(10 Hours)

Unit 2: Java Programming Concept: Structure of Java Program, I/O Statement- Command line Argument, Data Input Class. Exceptions: Exceptions and Exception Handling, Types of Exception. Strings: Strings, String functions. Method Overloading, Method Overriding, Constructor: Constructor-Default & Parameterized. Multithreading: State Transition Diagram of Thread, Life Cycle of Thread. Keywords: THIS, SUPER, FINALLY, Java Packages: Package, Types of Packages- System & User Defined- defining and Implementing.

(10 Hours)

Unit 3: Applets: Applet, Types of Applet, Difference over JSAP.Applet Life Cycle. Classes: Graphics, Label, TextField, Button, ScrollBar, Checkbox and their events. Event Handlers. HTML tags: <HTML>, <HEAD>, <TITLE>, <BODY>, <P>, <HR>, <BR>, <U>, <A>, <FONT>, <IMG SRC>, <INPUT TYPE>-TEXT, PASSWORD, RADIO, CHECKBOX, SUBMIT, RESET. Programming with Applet, Execution using- JDK & HTML.

(10 Hours)

Unit 4: Java Servlet and Java Script: Java Servlet: Servlet, Servlet Architectures, Packages, Life Cycle. Servlet Programming Java Script: Script: The Object Types & Arrays, Operators & Expression: Arithmetic, Logical, Comparison, String, Bit Manipulators, Assignment, Ternary. Script Programming Statements, Embedding script into HTML. Interactive Web Page Development, Interfacing with the Database, Characteristics of Web sites- based on their intended purpose.

(10 Hours)

Reference Books:

1. Deitel: Internet & World Wide Web “How to Program Pearson Education.
2. Keytom Weissinger, ASP in a nutshell, 2<sup>nd</sup> Edition, O’reilly press.
3. Shielt : Complete Reference ( TMH)
4. E. Balgurusamy : Programming with Java(TM)
5. Danny Goodman : Java Script and DHTML Cook Book, O’reilly press.
6. Marty Hall & Larry Brown: Core Servlets and Javasever Pages (SUN Microsystem)
7. James Jaworski :JAVASCRIPT an Jscript BPB.
8. Walther&Levine: Teach Yourself E -Commerce Programming with ASP ( Techmedia)
9. Patrik Baughton : The JAVA Handbook (TMH)

Sample Programs:

1. Write a Java program to find the factorial of N numbers using command line argument.
2. Write a Java program to display the N Prime numbers using command line argument.
3. Write a Java program demonstrating String Operations.
4. Write a Java program demonstrating Multithreading.
5. Write a Java program demonstrating Exception Handling.
6. Write a Java program for user defined package program.
7. Write a Java program demonstrating Method overloading.
8. Write a Java program demonstrating Constructor overloading.
9. Write a Java program demonstrating Method Overriding.
10. Write an Applet program to display Geometrical Figures using objects.
11. Write an Applet program which illustrate Scroll bar object.
12. Write an Applet program to change the background color randomly.
13. Write an Applet program to change the color of applet using combo box.
14. Write an Applet program to implement Digital Clock using thread.
15. Write an Applet program to implement Mouse event.
16. Write an Applet program to implement Keyboard event.
17. Create an Interactive web page to display the result of the student using HTML tags, embedding Java Script.
18. Demonstration of JAVA Servlet Program.

Note: A minimum of 20 assignments should be done by each student.



BSCS 6.2 : Data Base Management Systems

Total teaching Hours : 50

Unit 1 : Introduction : Concepts of Data, data base and DBMS and data base system. Characteristics of data base approach. People associated with DBMS. Advantages of DBMS. When not to use DBMS.

( 5 Hours)

Unit 2 : Data base system concepts & Architecture: Schema & instances. Three schema architecture of DBMS. Data independence. Database languages and interfaces. Database system environment. Classification of DBMS

(5 Hours)

Unit 3 : Data modeling using Entity – Relationship Model: Data Models. Types of data models. E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute and domain of an attribute. Relationships between the entities. Relationship types. Degree and cardinality ratio of a relationship. Weak entity types. Notion of E-R diagram. Proper naming of schema constructs.

(8 Hours)

Unit 4: Relational Data Model : Relational model concepts : Domains, attributes, tuples and relations. Characteristics of relations. Relational model constraints : Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values. Operations on relations: insert, delete and update operations.

( 8 Hours)

Unit 5 : Relational Algebra & Relational Calculus : Basic Relational Algebra operations : SELECT, PROJECT and RENAME. Set theoretical operations on relations : UNION, INTERSECTION, MINUS and CROSS PRODUCT. JOIN operations : Natural join, Equi join, theta join and DIVISION operation. Aggregate functions and grouping. Tuple Relational Calculus : Formula using universal and existential quantifiers. Domain relational calculus.

(8 Hours)

Unit 6 : Functional Dependencies & Normalization: Informal Design Guidelines for Relational Schema : insertion, deletion and modification anomalies. Functional Dependencies: Definition, Inference Rules. Normal Forms based on Primary keys: First, Second and Third Normal Forms. Boyce – Codd Normal Form.

(8 Hours)

Unit 7: Transaction Processing Concepts: Introduction to transaction Processing: Single user & multi user systems. Transactions: read & write operations. Need of concurrency control : The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering. Deadlock & Starvation.

(8 Hours)

Reference Books:

1. Elmasri & navathe : Fundamentals of Database System(Pearson Education).
2. Ramkrishnan Gehrae : Database Management System(TMh).
3. C J Date : Introduction to Database System.
4. Raghu Ram Krishnan: Database Management Systems (TMH).
5. Martin : Principles of Database Management (THI)
6. Jeffrey D Ullman: Principles of Database System.
7. Sunderarman : Oracle Programming a Primer. Pearson Education
8. Oracle Press : Oracle Complete Reference.

BSCS 6.4: Computer Lab – VIII Based on Oracle

Sample Programs:

Database **1**: ACCIDENT

Consider the following relations for an accident recording database application

PERSON ( Driverid :String, name:String, Address: String)  
CAR ( Regno: String, Model(Company): String,Year: int)  
ACCIDENT ( Reportno :Number, Date: Date, Location: String)  
OWNS ( Driverid: String, Regno: String)  
PARTICIPATED (Driverid:String, Regno:String,  
Reportno:Number,Damageamount:integer)

- a. Create the above tables by properly specifying the primary key.
- b. Enter At least five tuples for each relation.
- c. Execute the following queries
  1. Demonstrate how to update the damage amount for the car with a specific regno.
  2. List the drivers (name, address & damage amt) who have participated in an accident

Database **2**: COMPANY (SHIPMENT)

Consider the following relations for an order processing database application in a company

CUSTOMER (Customerno:Integer,Customername:String,City:String)  
ORDER (Orderno:integer,orderDate:date,  
customerno:int,Orderamount:dec)  
ITEM (Itemno:int,unitprice:decimal)  
ORDERITEM (Orderno:int,Itemno:int,Quantity: int)  
WAREHOUSE (Warehno:int,City:String)  
SHIPMENT (Orderno:int,Warehno:int,Shipdate:Date)

- a. Create the above tables by properly specifying the primary key
- b. Enter At least five tuples for each relation.
- c. Execute the following queries
  1. List the item no, unit price, quantity and total price for a particular order no.
  2. List the customer name, city, order number and order amount for a particular customer.

Database **3**: STUDENTS, COURSES & BOOK ISSUED

Consider the following relations for Student, courses & Book issued database.

STUDENT (Regno:String, Name:String; Major:String; Bdate:Date)  
 COURSE (Courseno:Integer, Cname:String; Dept:String)  
 ENROLL (Regno:String; Course;integer; Semester:Integer: Marks:int)  
 BOOKADOPTION (Courseno:Integer ;Semester:Integer;BookISBN:Int)  
 TEXT ( BookISBN:Int; BookTitle:String;Publisher:String;Author:string)

- Create the above tables by properly specifying the primary key.
- Enter At least five tuples for each relation.
- Demonstrate how to add new text book to the database and make this book be adopted by some course
- Execute the following queries
  - Produce a list of textbooks with Book ISBN, Title, publisher, author, course name and course number adopted by some course.
  - List the name, major, course, semester and the marks obtained by a particular student.

#### Database 4: BOOK DEALER

Consider the following relations for a database application for a Book Dealer

AUTHOR ( Authorid int, Name:String, City:String, Country:String )  
 PUBLISHER ( Publisherid:int, Name:String, City:String, Country:String )  
 CATALOG ( Bookid:int, Title:String, Authorid int, Publisherid:int, Categoryid: int, Year:int, Price:int )  
 CATEGORY ( Categoryid: int, Description:String )  
 ORDERDETAIL ( Oredrno:int, Bookid:int, Quantity:int )

- Create the above tables by properly specifying the primary key.
- Enter At least five tuples for each relation.
- Execute the following queries
  - Demonstrate how to increase the price of the book published by a specific publisher by 10%.
  - Display the title of the book having maximum sales.

#### Database 5: BANK

Consider the following relations for a Bank database application

BRANCH (BranchID: integer, Branchname: String, Branchcity:String, Assets:Real)  
 ACCOUNT ( Accno:Int, BranchID:Integer, Balance:Real)  
 CUSTOMER (AccountNo: Integer, Customername:String, CustomerCity:String)  
 LOAN ( Loano:Integer, BranchID : Integer, Amount:Real)  
 BRROWER (AccountNo: Integer, Loano:Integer )

- Create the above tables by properly specifying the primary key
- Enter At least five tuples for each relation.
- Execute the following queries:
  - List the names of the customers with their Loan Amount who have taken loan from the main branch( in any city)
  - Find all the customers who have accounts at the main branch.

*Note: At least FIVE Databases with at least FIVE tables including Queries should be done by each student.*