Course Structure and Syllabus for

Bachelor of Science (Computer Science)

(Six Semester Course)

Proposed for 2015 batch onwards

With

CHOICE BASED CREDIT SYSTEM (CBCS)

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

DEPARTMENT OVERVIEW

VISION STATEMENT

The vision of the department is to make possible for our students to have a deep and analytical understanding of the field and to enable them to use their immense potential to enhance the quality of human life.

MISSION STATEMENT

The mission of the department is to offer a high-quality science education in the science of computing, as well as to prepare students for career opportunities in this area requiring a high level of technical knowledge and skill. The department will continue to develop and administer programs which serve the needs of industrial computer scientists, researchers, and computer application specialists for whom the discipline of computing sciences provides indispensable tools.

INTRODUCTION TO PROGRAM

Bachelor of Computer Science is a three year six semester three major undergraduate programme with Computer Science as one of the subject. The course is designed to function as an intermediate between the industry and academic institutes. The curriculum includes the latest technologies to prepare the student for the future. The student gains a strong foundation and skills in the field. The infrastructure provides an excellent environment for the student to contribute effectively in the field.

PROGRAM OBJECTIVE

Provide a strong foundation in fundamentals of computers. Prepare the students with exceptional skills of problem solving, communication and leadership skills. Facilitate overall understanding of the requirements of the subjects. Prepare the students to provide professional solutions to real time problems.

SEMESTER WISE COURSE STRUCTURE

Semester	Code	Course title	Hrs / week	Credits	IA	SE	Total
		Theory					
I	CS115	Computer organization and Programming in C	4	4	30	70	100
		Practical					
I	CS1P1	C Programming lab	2	1	15	35	50
		Theory					
II	CS215	Data structures and Operating system	4	4	30	70	100
		Practical					
II	CS2P1	Data structures lab	2	1	15	35	50
		Theory					
III	CS315	OOPS using C++ and DBMS	4	4	30	70	100
		Practical					
III	CS3P1	C++ and SQL lab	2	1	15	35	50
		Theory					
IV	CS4115	Visual Programming	2	2	15	35	50
Soft Core Paper (For Other Students)							
IV	CSOE4215	Web Development	2	2	15	35	50
		Practical					
IV	CS4P1	Visual programming lab	2	1	15	35	50
		Theory					
V	CS5115	Java programming	3	3	30	70	100
	CS5215	Software Engineering	3	3	30	70	100
		Practical					
V	CS5P1	Java programming lab	2	1	15	35	50
	CS5P2	Web designing / Mini Project lab	2	1	15	35	50
		Theory					
VI	CS6115	Computer networks	3	3	30	70	100
	CS6215	Computer graphics	3	3	30	70	100
		Practical					
VI	CS6P1	Major project lab	2	1	15	35	50
	CS6P2	Computer graphics lab	2	1	15	35	50

EXAMINATION AND ASSESMENTS

1.	**IA Weight age**	**30 %**
2.	**End Semester Examination Weight age**	**70%**

QUESTION PAPER PATTERN

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	2	10	10	20
B	6	7	5	30
C	10	3	2	20
			Total Marks	**70**

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	10 marks
3.	Formatting the program and output	05 marks
3.	Record verification	05 marks
4.	Viva voce related to practical topics only	05 marks
	Total	35 marks

PROJECT EVALUATION FORMAT

Scheme of valuation:

1.	Demonstration and presentation	20 marks
2.	Documentation	15 marks
	Total	35 marks

INTERNAL ASSESSMENT FORMAT

THEORY:

1.	IA test	15 marks
2.	First Activity	10 marks
3.	Attendance	5 marks
	Total	30 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 : Computer Organization And Programming in C
CODE : CS215
Hrs / Week : 4 Hrs
CREDITS : 4

Course Objective:

The subject provides the foundational concepts on computer hardware, software, and the logics for their connectivity. It gives basic inputs on the upcoming computer technologies. It focuses on different number systems and its applications in computers. The course also builds the logical thinking in the students with the help of the programming concepts and also gives the practical exposure to problem solving using the C programming language.

Learning Outcome:

- To know the working principle of a computer.
- Ability to use Boolean algebra in different number systems and performing computations.
- Write good programs to solve different types of problems.
- Ability to design efficient logic and implementation.

UNIT I: COMPUTER ORGANIZATION 30 Hrs

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

Representation of Data: **6 Hrs**
Number Systems, and Inter-conversions among them, Binary arithmetic (Addition, Subtraction, multiplication, division) Binary number system complements- 1's and 2's complements subtractions, ASCII,Excess-3 code and Gray code, EBCDIC code and BCD code.

Boolean Algebra and Logic Circuits: **6 Hrs**
Boolean Algebra Laws and theorems, Gates- AND, OR, NOT,NAND, NOR, EXOR truth tables, Boolean expressions and their simplifications, SOP & POS- Karnaugh map simplification methods.

Combinational and Sequential circuits: **9 Hrs**
Multiplexers, Demultiplexers, Decoders, Encoders, Half Adder, Full Adder, Parallel Adder-subtractor, Flip flops- RS, JK, D, T, Master Slave , Counters(Binary, modulus counters), Shift registers.

I/O Devices: **2 Hrs**
Data transfer Concept, Program control, Interrupt control, DMA Control, Keyboard, VDU, printer.

Memory: **4 Hrs**

Memory hierarchy, ROM, RAM (1 dimensional and 2 dimensional RAM), Cache Memory , Organization of Cache Memory , Virtual memory, Addressing modes, Instruction format, instruction set.

UNIT-II : PROGRAMMING IN C: 30 Hrs

Introduction To Programming: **4 Hrs**

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.

Introduction To C Programming: **3 Hrs**

History, C Conventions, Character Set, Identifiers, Keywords, Simple Data types, Modifiers, Variables, Constants, Operators, Operator precedence, Structure of a C program.

Input and Output: **1 Hrs**

Input and Output operation: Single character input and output, formatted input and output, Buffered input.

Control Structures: **6 Hrs**

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.

Arrays: **5 Hrs**

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

Functions: **5 Hrs**

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.

Storage Classes, Structures and Unions: **4 Hrs**

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.

Pointers: **2 Hrs**

Introduction, pointer variable, pointer operator, pointer arithmetic, pointers and arrays, pointers and strings, array pointers, dynamic allocation.

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. ANSI C by Balaguruswamy
7. Computers today by Sanders, Mcgraw Hill, 1987.
8. C programming by Stephen C Kochan.
9. Spirit of C by Cooper, 1987

PRACTICALS

TITLE : C PROGRAMMING LAB
CODE : CS1P1
Hrs / Week : 2 Hrs
CREDITS : 1

Guidelines:

. Follow Coding standards and write structured programs.
. The output of the programs should be neatly formatted.
. The programs should be user friendly and interactive.
. Use comments wherever necessary.

1. To demonstrate the usage of operators and data types in C

a. Write a program to print the size of all the data types with its modifiers supported by C and its range.
b. Write a program to calculate simple interest.

2. To demonstrate the usage of if, if-else, nested-if and switch

a. Write a program to find the largest, smallest and second largest of three numbers.
b. Write a program to accept marks of three subjects calculate the total percentage and output the result of the student.
c. Write a program to find the second largest of four numbers.
d. Write a program to calculate Julian date.

3. To demonstrate the usage of while, do-while and for loops

a. Write a program to find the sum of numbers from 1 to N.
b. Write a program to reverse a number.
c. Write a program to generate the Fibonacci series.

4. To demonstrate the concept of arrays and strings

a. Write a program to check whether a string is a Palindrome.
b. Write a program to insert a number at a given position in an array.
c. Write a program to arrange a list of numbers in ascending order.
d. Write a program to check whether a given matrix is symmetric or not.
e. Write a program to perform matrix multiplication.

5. To demonstrate the usage of functions and recursion

a. Write a program to check whether a given number is prime or not.
b. Write a program to find the roots of a quadratic equation
c. Write a recursive program to find the factorial of a number.
d. Write a recursive program to find x^y.

6. To demonstrate the concept of structures

a. Write a program to create a student structure and display the same.

7. To demonstrate the concept of pointers

a. Write a program using function to swap two numbers using pointers

SECOND SEMESTER

TITLE : Data Structures and Operating Systems
CODE : CS215
Hrs / Week : 4 Hrs
CREDITS : 4

Course Objectives:

- To be able to practically implement the data structures like stack, queue, array etc.
- To understand and implement different searching and sorting
- To introduce to the concept behind the Operating system.
- To acquire the fundamental knowledge of the operating system architecture and components
- To know the various operations performed by the operating system.

Learning Outcome:

- Understand the need for Data Structures when building Applications.
- Able to walk through insert and delete for different data techniques.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

UNIT I DATA STRUCTURES 30 Hrs

Introduction to data structures: 2 Hrs
Definition, Classification of data structures. Operations on data structures. Introduction to Time and Space complexity

Primitive data structures: 2 Hrs
Integer, Character, float, Strings, memory representation and primitive operations. String manipulations using pointers.

Arrays: **2 Hrs**

Storage representation of 1D and 2D arrays. Insertion and deletion on 1D arrays, advantages and dis-advantages of arrays.

Stacks and Queues: **10 Hrs**

Concepts, operations, sequential and linked implementation, Applications of stacks - recursion, tower of Hanoi, Infix to postfix, Evaluation of postfix expressions. Concepts of queues, operations, sequential and linked implementation, circular queues, Priority queues and Dequeues (Introductory Concept)- Application of queues.

Linked lists: **5 Hrs**

Pointers, Dynamic memory allocation, Singly linked lists, operations on linked lists - Insertion and Deletion of a node. Introduction to circular linked list and doubly linked list.

Trees: **4 Hrs**

Definitions and concepts-Binary trees, sequential and linked representation of Binary trees, Insertion and Deletion of binary trees, Binary tree traversals.

Searching and Sorting : **5 Hrs**

Linear search and Binary search, Selection sort, Insertion sort, Merge sort.

UNIT II **OPERATING SYSTEM** **30 Hrs**

Introduction to Operating Systems: **6 Hrs**

What is an operating system (OS)? History of OS, Simple Batch systems, Multi-programmed Batched Systems, Time sharing systems, Personal Computer Systems, Distributed Systems and Real time Systems. Operating System structures, Command Interpreter System, Operating System Services, System calls, system programs.

Process concept: **9 Hrs**

Process control block, Process Scheduling, CPU Scheduling- Basic concepts, Scheduling criterian, Scheduling algorithms- FIFO, RR, SJF, Multi level, Multi-level feedback.

Memory management: **7 Hrs**

Basic Concepts, logical and Physical Address space, Swapping, Contiguous Allocation, paging, Segmentation, Virtual memory-Demand paging, page replacement, page replacement algorithm, allocation of frames, Thrashing and Demand Segmentation.

File System: **5 Hrs**

File concept, access methods, directory structure, protection, File system structure, Allocation methods, Free space Management.

I-O Systems: **3 Hrs**

Overview of I/O systems, I/O interface, secondary storage structure-Disk structure, Disk Scheduling

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.
5. Operating System by Milan Milenkovic, McGraw Hill.
6. Operating System by Madnick and Donoval, McGraw Hill.
7. Operating System Concepts by James L Peterson
8. Operating System Design and Implementation by Andrew S Tenenbaum

PRACTICALS

TITLE : DATA STRUCTURES LAB
CODE : CS2P1
Hrs / Week : 2 Hrs
CREDITS : 1

Guidelines:

. Follow Coding standards and write structured programs.
. The output of the programs should be neatly formatted.
. The programs should be user friendly and interactive.
. Use comments wherever necessary.

1. Illustrate function using call by value and call by reference
2. Insertion Sort
3. Selection Sort
4. Linear Search
5. Binary Search
6. Length of a string using pointer
7. Concatenate two strings using pointers
8. Copy a string using pointers
9. Array implementation of a stack.
10. Array implementation of a queue
11. Array implementation of circular queue.
12. Creating a linked list.
13. Adding nodes at various positions in a linked list.
14. Deleting nodes from various positions from a linked list.
15. Creating a binary search tree and Performing the various traversals on a binary search tree.

THIRD SEMESTER

TITLE : OOPS Using C++ and DBMS
CODE : CS315
Hrs / Week : 4 Hrs
CREDITS : 4

Course Objective:

- Comparison between procedural languages and object languages.
- The concepts of operator overloading and function overloading, files, exceptions are discussed to expose the students to the advantages of object oriented programming.
- To provide strong foundation of database concepts and develop skills for the design and implementation of a database application with a brief exposure to advanced database concepts.
- Basic concepts of classes and objects make it easy to represent real world entities.

Learning Outcome:

- An understanding of the principles behind the object oriented development process.
- Competence in the use of object oriented programming language in the development of small to medium sized application programs.
- Understanding the core terms, concepts, and tools of relational database management systems. Understanding database design and logic development for database programming.

UNIT-I OOPS AND C++ 30 Hrs

Introduction to OOP and C++: 2 Hrs
Characteristics and benefits of OOPs, History of OOP, Structure of C++ program, Data types and operators, Statements of C++, tokens, Expressions and control structures, operators in C++.

Input output objects: 2 Hrs
Usage of cin and cout objects, Comparison of stdio.h and iostream.h

Control structures: 2 Hrs
if, if-else, nested-if, switch, while, do-while, for, nested for, break and continue statements (use of conditional and logical operators).

Arrays, Functions and structures: 6 Hrs
Array fundamentals, types, strings, C supported functions, prototyping, Inline functions, overloaded functions, functions with default arguments, storage classes, call-by-reference, return by reference, defining and using a structure.

Objects and classes: **6 Hrs**

Introduction-specifying a class-defining member function-nesting of member functions, arrays within a class, Arrays of objects, Objects as function arguments, Friend functions, pointer to members.

Constructors, destructors and operator overloading: **6 Hrs**

Constructors, types of constructors, copy constructor, overloading constructs, destructors, Operator overloading (Unary and binary operators), data conversion.

Inheritance: **6 Hrs**

Extending Classes- defining derived classes-single, multilevel, multiple, hierarchical, and hybrid inheritance. Virtual base classes- Abstract classes- pointers. Virtual functions and polymorphism-pointers to objects, this pointer.

UNIT-II DATA BASE MANAGEMENT SYSTEM 30 Hrs

Introduction: **10 Hrs**

Basic Concepts: Data, database, DBMS, Disadvantages of File oriented systems, Advantages of DBMS, database users, Database Languages, Characteristics of Database, Role of DBA, Data Abstraction (Views) – Logical, Conceptual & Physical, Data independence – physical and logical independence.

Data Models: **6 Hrs**

Introduction to Data Models: E-R model, Relational model, network model and hierarchical model.

RDBMS: **8 Hrs**

Relational database concepts, attribute, tuple, types of attributes, single, multi-valued, stored, derived etc., keys, primary, index, candidate, alternate, foreign, Relationships, Relational algebra operations, union, intersection, difference, cartesian product, selection, projection, join, division, relational calculus, Normalization and its properties (1st , 2nd and 3rd and BCNF).

DDL and DML: **6 Hrs**

DDL commands - create table/views/index, drop, alter, DML commands – select, insert, delete, update, etc., DCL commands – grant, revoke, commit, TCL commands, SQL – query, sub-query, nested query, Joins – natural, inner, outer join.

BOOKS :

1. E. Balaguruswamy : Object Oriented Programming with C++, Tata McGraw Hill Publications.
2. Strousstrup : The C++ Programming Language, Pearson Edition, 3rd Edition
3. Kamthane : Object Oriented Programming with ANSI and Turbo C++, Pearson Education
4. Elmasri & Navathe, Fundamentals of Database Systems (Fourth Edition), Pearson Education, 2003.
5. Sundarraman, Oracle 9i programming A Primer,1/e Pearson Education.
6. Karate, Introduction to Database Management System, Pearson Education 2004.

PRACTICALS
TITLE : C++ and SQL LAB
CODE : CS3P1
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 whether a given number is prime using function overloading.
8. Calculate compound interest using default arguments where $CI = P * (1 + R / 100)^{T}$.
9. 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 ' +'
4. 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

PART C (SQL)
Implementation of different SQL Commands.

FOURTH SEMESTER

TITLE : Visual Programming
CODE : CS4115
Hrs / Week : 2 Hrs
CREDITS : 2

Course Objective:

- This course introduces differences between the procedural languages and event-driven languages. Define and modify the properties and methods associated with an object.
- Load, modify, and save changes made to forms and projects in the Visual Basic environment
- Define and implement form objects. Use control array in your applications, Use the debugger in the Visual Basic environment to set breakpoints, program step, procedure step, and display any program variable
- Identify and perform the steps necessary to convert Visual Basic programs to executable files that will run in the Windows environment.

Learning Outcome:

On successful completion if this course, students should be able to:

- To design and develop Windows-based business applications using Visual Basic.NET programs that meet commercial programming standards.
- Work is equivalent to that expected from someone already working in the information technology field as a professional programmer.

Introduction to Visual Programming: 2 Hrs
The integrated Development Environment – menu bar, tool bar, from designer, project explorer, properties window, from layout window, Write, run, save, and print a project, Use online Help.

Introduce controls and their properties: 3 Hrs
The form object: Properties, events and methods pf forms; Properties – Name, Captain, Backcolor, Borderstyle, controlbox, maxbutton, minbutton, moveable, startup position, height, width, left, top, scalemode, window, state; Events –load, unload, Clerk, Activate, Deactivate, Resize, methods – Show, hide, cls, Unload, print, Controls – Properties and events of different controls such as 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. Predefined Dialog Boxes – MsgBox and Inputbox

Variables, constants and calculations: **3 Hrs**
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.

Decisions and conditions: **3 Hrs**

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. Declare arrays and refer to elements using subscripts, Use For Each/Next statements, Structure Variables, Store data in multidimensional array, control array

Lists, Loops, and Printing: **2 Hrs**

Create and use list boxes and combo boxes, Use Do/Loops and For/Next statements, Send information to the printer.

Menus, procedures and functions: **4 Hrs**

Create menus and submenus for program control, Write reusable code in sub procedures and sub functions.

Toolbars and Status bar: **3 Hrs**

Creating toolbars, Adding images to toolbars, Writing code to work with toolbars, Creating and using a status bar, Adding panels to the status bar, Common Dialog (Open/SaveFile), ProgressBar

Database Connectivity: **9 Hrs**

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.

Multiple Document Interface (MDI): **1 Hrs**

Overview of MDI, Creating parent and child forms, Writing code for parent and child forms, Child window management, Creating applications.

Text Books:

1. Gurumit Singh, "Visual Basic 6", First Edition, Firewall Media, 2007.
2. Charles Petzold, "Windows Programming", 5th Edition, Microsoft Press, 1999. 2.Steve Holzner, "Visual C++ Programming", Second Edition, PHI, 1994. 3.Go ttfried, "Programming with Visual Basic 6", PHI, 2000.

TITLE : Web Development
CODE : CSOE4215 (Open elective for other students)
Hrs / Week : 2 Hrs
CREDITS : 2

Course Objectives:

On successful completion of the course the students will be able to do the following:

- To provide an in-depth training for web development skills.
- To understand and develop l web pages independently.
- To understand the methods of debugging and correcting anomalies.

- To provide a proper foundation for learning other tools of web development.

Internet Basics: **10 Hrs**

Introduction to internet and its applications, E-mail, telnet, FTP, E-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, netscape navigator etc. search engine, web saver – apache, proxy server, HTTP protocols

Web Designing Technologies: **10 Hrs**

Introduction to HTML, ASP, JSP, Java scripts, VB scripts, HTML/DHTML – file creation, HTML tags, titles footers, text formatting, forms, images, lists, tables, linking documents, front page editing, frame sets, order list, un-order list, special characters

Java Script: **5 Hrs**

Introduction to Java script, writing java script into HTML, Building of Java Script Syntax Data types of variables, arrays, operators, expressions, programming construct of conditional checking, loop ends functions, dialogue boxes

CSS: **5 Hrs**

Understanding the importance of CSS, Types: inline, internal and external with examples.

BOOKS

1. E. Balaguruswamy, Programming with JAVA, A Primer, 2nd Edition., TMH 2
2. KenArnold & James Gosling, The Java Programming Language, Addison – Wesley, (1998)
3. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, 3rd Edition, TMH, (1999).
4. Internet 6-in-1 by Kraynak and Habraken, Prentice Hall of India Pvt. Ltd., New Delhi
5. Internet for Everyone by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi.

PRACTICALS

TITLE : Visual Programming Lab
CODE : CS4P1
Hrs / Week : 2 Hrs
CREDITS : 1

1. Design an application to calculate the area and circumference of a circle.
2. Design an application to find the sum of numbers.
3. Write a VB Program to design a simple calculator to perform addition, subtraction, multiplication and division(Use functions for the calculations).
4. Design a User Interface (UI) to accept the student details such as name, department and total marks. Validate the input data and calculate the percentage and division.
5. Design an application to add and remove item from list box.

6. Design a VB application which has MDI and Child forms. Create a menu having the items such as file (New, Open),Format (Font, Regular, Bold ,Italic) and Exit in the MDI form. Also create a text box and use a Common Dialog Box control for changing the font, fore color and back color of the text box
7. Design an application to authenticate travel system using list and combo box.
8. Design a small Alarm Clock Application.
9. VB program to calculate the simple interest and compound interest.
10. Write a VB Program to Validate the username and password form the database and display the appropriate message.(Use Data Control)
11. Design a VB application to record the employee details such as EmpId, EmpName, Designation and BaiscPay. Calculate the DA, HRA, Deduction and Gross Salary.(Make the necessary assumptions)Use Select .. case for decision making.
12. Design a calculator.
13. Design an application to find the area and perimeter of a square using subroutine.
14. Design an application to create front end and back to implement ADO connection. Design an application to implement crystal report.
15. Design an application to implement arithmetic operation using subroutine.
16. Design an application to implement scroll bar to the change the font size of the label.
17. Design an application to implement Menu Editor.
18. Design an application to move image using timer.

FIFTH SEMESTER

TITLE : JAVA programming
CODE : CS5115
Hrs / Week : 3 Hrs
CREDITS : 3

Course Objective:

This course introduces fundamental structured and object-oriented programming concepts and techniques, using Java, and is intended for all who plan to use computer programming in their studies and careers.

Learning Outcomes:

On successful completion if this course, students should be able to:

- Understand the basic concepts and principles of structured programming.
- Understand the basic concepts and principles of object oriented programming.
- Design, write, and test a Java program to implement a solution to a given problem specification.

Introduction to JAVA: 10 Hrs

JAVA Evolution, Introduction to Programming Languages, The Evolution of Java, Object-Oriented Programming Concepts and Java, Differences between C++ and Java, The Primary Characteristics of Java, The Architecture, 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 Using 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.

Classes, Arrays, Strings and collection frame work: 10 Hrs

Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, 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.

Interfaces, Packages, and Multithreaded Programming: **5 Hrs**

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.

Multithreaded Programming: **10 Hrs**

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.

Managing Exceptions, Applet Programming: **10 Hrs**

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

BOOKS:

1. Shishir Gundavaram, CGI Programming on the World Wide Web, O'Reilly and Associates, (1996).
2. E. Balaguruswamy, Programming with JAVA, A Primer, 2nd Edition., TMH (1999)
3. 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 : Software Engineering
CODE : CS5215
Hrs / Week : 3 Hrs
CREDITS : 3

Course Objective

- To inculcate in students different concepts of software engineering principles
- To develop the skills necessary to design, develop and execute software projects.
- Be able to design software by applying the software engineering principles.

Learning outcome

Upon successful completion of this course student should be able to

- Understand the importance of software life cycle.
- Understand the various process models.
- Implement developed software efficiently and effectively.

Introduction : **6 Hrs**

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

Computer based System Engineering : **4 Hrs**

Systems and their environment, System Procurement, System Engineering Process, System architecture modeling, Human Factors, System reliability Engineering.

Requirements and Specification: **8 Hrs**

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.

Software prototyping: **4 Hrs**

Prototyping in software process, Prototyping techniques, User interfaces prototyping.

Software Design: **5 Hrs**

Design Process, Design Strategies, Design Quality, System Structuring, Control models, Modular decomposition, Domain Specific architecture.

Software Reliability and reusability: **8 Hrs**

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.

Software Verification and Validation: **10 Hrs**

The testing Process, Test Planning & Strategies, Black Box, Structural, interface testing, Program inspections, Mathematically based verification, Static analysis tools, Clean room software development.

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 : Java Programming Lab
CODE : CS5P1
Hrs / Week : 2 Hrs
CREDITS : 1

1. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result

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.
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.

TITLE : WEB DESIGNING MINI PROJECT
CODE : CS5P2
Hrs / Week : 2 Hrs
CREDITS : 1

Mini Project Lab Guidelines

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 : COMPUTER NETWORKS
CODE : CS6115
Hrs / Week : 3 Hrs
CREDITS : 3

Course Objective:

To study about network components.
To study about topologies and network models.

Learning Outcome:

Students will gain knowledge about networks, internal components and its functionality. To study about various network protocols, algorithms.

Introduction: 6Hrs
Definition of networks, objectives of network, categories of network (LAN, MAN, WAN and Internet) , ISO OSI Reference Model, TCP reference model, topologies used in networking (Point-to-point, Broadcasting).

Physical layer: 6 Hrs
DTE-DCE Interface, transmission media – magnetic media, twisted pair, base band coaxial cable, broad band coaxial cable, fiber optics, satellite communications, Multiplexing – FDM, TDM, Switching – circuit, message and packet, ISDN services.

Data link layer: 6 Hrs
Design issues and services provided to higher layers, Framing, Error correction and error detection, DLL protocols – unrestricted simplex protocol, simplex protocol, stop and wait, piggybacking, sliding window protocol – 1-bit sliding protocol.

MAC sub layer: 8 Hrs
MAC protocols- Aloha and slotted aloha, CSMA and CSMA/CD, IEEE Standards – cabling, Manchester, Differential Manchester Encoding, 802.3 (Ethernet).

Network layer: 6 Hrs
Design issues- services provided to transport layer, routing algorithms – optimality principle, shortest path, flooding-definition. Congestion control algorithm – principles of congestion control.

Transport layer: 4 Hrs
Concepts, services provided to the upper layer, quality of service.

Presentation layer: **4 Hrs**
Data compression techniques, network security – traditional cryptography and other cryptography techniques (Introductory concepts only).

Application layer: **5 Hrs**
E-mail, Overview of TCP\IP.

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.

TITLE : Computer Graphics
CODE : CS6215
Hrs / Week : 3 Hrs
CREDITS : 3

Graphics Systems: **5 Hrs**
Display Devices, Hard Copy Devices, Interactive Input Devices, Display Processors, and Graphic software.

Output Primitives: **10 Hrs**
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.

Two Dimensional Transformations: **10 Hrs**
Basic transformations, translation, Scaling and Rotation. Matrix representations and homogeneous co-ordinates, composite transformation -translation, scaling and rotations. Raster methods for transformation.

Windowing and Clipping: **8 Hrs**
Windowing concepts clipping algorithms, line clipping, area clipping, Blanking window to view port transformations.

Interactive Input Methods: **6 Hrs**
Physical input devices : keyboards, touch panels, line pens, graphics tablets, joysticks, mouse, trackball, interactive picture construction techniques.

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

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, McGraw Hill
5. Graphics Under C – Yeshwant Kanetkar, BPB Publications.
6. James D Foley, Adries Van Dam, Steven K Feiner, John F Hughes, Computer Graphics, Addison Wesley, 1997.
7. Cooley: The Essence of Computer Graphics Pearson Education

TITLE : MAJOR PROJECT
CODE : CS6P1
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.

TITLE : Computer Graphics Lab
CODE : CS6P2
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 and Horizontal histogram.
9. Pie-chart.
10. Animation- Man walking with an umbrella.