Bangalore University
B.Sc Computer Science Syllabus
(Semester System)

First Semester
CSIT1: Computer Fundamentals and C Programming
CSIP1: C Programming Lab

Second Semester
CSIIT1: Data Structures and Operating Systems
CSIIP1: Data Structures Lab

Third Semester
CSIIIT1: OOPS using C++ and DBMS
CSIIIP1: C++ Lab

Fourth Semester
CSIVT1: Software Engineering and System Software
CSIVT2: Human Resource Management (Special Paper)
CSIVT1: DBMS Lab (mini project)

Fifth Semester
CSVT1: Internet Technology
CSVT2: Basic Java and Unix Programming
CSVP1: Internet lab
CSVP2: Java and Unix Lab

Sixth Semester
CSVIT1: Interactive Computer Graphics and computer Networks
CSVIP1: Project Lab

CSIIT1: Data Structures and Operating System
Total Teaching Hours/Semester: 60

I.   Data Structures
Introduction to data structures
Definition. Classification of data structures. Operations on data structures, Introduction to Time and space Complexity.

Primitive Data Structures
Integer, Character, float, strings-memory representation and primitive operations, String manipulation using pointers.

Arrays
Storage Representation for ID and 2D arrays, Insertion and deletion on Id arrays, advantages and disadvantage of arrays.

Linked Lists

Pointers, Dynamic Memory Allocation, singly Linked Lists, Operations on linked lists, Insertion and deletion of a node, Introduction to circularly linked lists and Doubly linked lists.

Stacks
Concepts, Operations, sequential and linked implementation, Application of stacks , recursion,tower of Hanoi, infix to postfix conversion, Evaluation of Postfix Expressions.

Queues
Concepts, operations, sequential and linked implementation, Circular queues, Priority queues and Dequeues (Introductory concepts), Application of queues.

Trees
Definitions and concepts – Binary trees, Sequential and Linked Representation of Binary Tree Trees, Insertation and deletion on binary trees, Binary Tyree Traversal

Graphs
Concepts, Sequential and linked representation of Graphs, BFS and DFS Traversal, Warshall's shortest path Algorithm.

Searching and sorting
Linear and Binary search, Selection sort, Insertion sort, Quick sort, Merge sort.

OPERATING SYSTEM

Introduction to Operating Systems

What is an operating system(OS)?, History of OS, Simple Batch Systems, Multiprogrammed 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 Management
Process Concept, Process control Block, Process Scheduling, CPU Scheduling – Basic Concepts, Scheduling Algorithms – FIFO, RR, SJF, Multi-level, Multi-level feedback.

Storage Management
Basci Concepts, Logical and Physical Address Space , Swapping, Contiguous Allocation, Paging, Segmentation, Virtual Memory – Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing and Demand Segmentation.

File System
File Concept, Access Methods, Directory Structure, Protection, File system Structure, Allocation Methods, Free-Space Management.

I/O Systems
Overview of I/O systems, I/O interface, Secondary storage structure – Disk Structure, Disk Scheduling.

References:
1. Tremblay J. P and Sorenson P. G. An introduction to data structures with application, 2nd Edition
2. Lipschultz, Seymour, Data Structures. Schaum's Series
3. Silberschultz, Abraham and Galvin,Peter Raer. Operating system Concepts,5th Edition John wiley and sons.

CSIIP1:DATA STRUCTURES LAB

Total Practical Hours/Semester : 45
1. Menu driven program to concatenate two strings and find the length of a string using pointer.
2. Menu driven program to copy a string and extract a substring using pointers.
3. Menu driven program to find GCD of two numbers and Factorial of given number.
4. Creation of linked list and insertion of an element into it.
5. Creation of linked list and deletion of an item from it.
6. Implementation of stack using pointers.
7. Implementation of Queues using Pointers.
8. Creation of Binary trees and its Traversals.
9. Implementation of Quick Sort, Insertion Sort and Selection sort.
10. Implementation of Binary search.

Scheme for Practical Examination:
1. Writing two programs (one from each part)   :10 marks
2. Execution of one program   : 10 marks
3. Practical Record   : 05 marks
4. Viva Voce   : 05 marks
                                        Total   :30 marks

CSIT1:   Computer Fundamentals and Programming in C

I.   COMPUTER FUNDAMENTALS

Introduction to Computers

Evolution of Computers, Generation of Computers, Classification of Computers Analog Digital and Hybrid Computers, Classification of Computers according to size, Super Computers, Mainframe Computers, Personal Computers (Different Types) and Terminals (Different Types), Characteristics of Computers, Block Diagram of a Digital Computer.

Introduction to Number system and codes

Different number systems and their conversions (Decimal, Binary, Octal , and Hexadecimal), 1's complement and 2's complement, Floating Point numbers, Coding – BCD, Gray, ASCII and EBCDIC.

Boolean algebra and Gate networks

Fundamental concepts of Boolean algebra, Inverter gates, AND gate, OR gate, NAND gate, NOR gate, X-OR gate, X-NOR gate, The universal property of NAND gate and NOR gate, Basic laws of Boolean algebra, De Morgan's theorems, Simplification of Boolean expression, Karnaugh map (SOP)

Combinational Logic

Adders (Half and Full), Decoder, Encoder,Multiplexer, De-multiplexer (Introductory Concepts only).

Flip-Flops

Flip-flops (SR flip-flops, D flip-flops, JK flip-flops), Edge – Triggered flip-flops and Master Slave flip-flops, Introduction to Registers and Counters

Computer Organization

Instruction format, Addressing modes, Instruction set.

Memory

Memory Heirarchy, Primary Memory-Volatile and non-valatile memory, RAM and ROM, EPROM and EEPROM, Secondary Memory-Floppy Disk and Hard Disk.

Input / Output Devices
Input Devices-Keyboard , Mouse, Output Devices – VDU, Printers.

Introduction to Programming Concepts

Types of Programming Languages, software, Classification of software, Application software and System Software, Structured Programming, Algorithms and Flowcharts with Examples.

II.   PROGRAMMING IN C

Introduction to C
History of C, Structure of a C program. The C character set, Constants, Variables and keywords, Types of constants and variables.

C Instructios diocese
Type declaration and arithmetic instructions, Integer and float conversions. Type conversion in assignment, Operators in C , Hierarchy of operators, control instructions, Input-Output statements in C (Formated and Unformatted)

Control Structures
Decision control structures, Logical operators, conditional operator and relational operators. Loop control structures –while, do-while, for loop, Break statement, Continue statement, switch-case control structure, goto statement

Arrays
One dimensional and multidimensional array, declaration, initialization and array manipulations, sorting(Bubble sort) Strings – Basic Concepts, Library Functions.

Functions
Definition, function definition and prototyping, types of functions, type of arguments, recursion, passing arrays to functions, storage class in C-automatic ,register, external and static variables.

Pointers
Definition, notation, pointers and arrays, array of pointers and functions – call by value and call by reference, Pointers to pointers.

Structures and Unions
Definition, decleration, accessing structure elements, Array of structure in a structure, Pointers and structures, Unions – definition, declaration,accessing union elements, typedef, Enum Bit fields.

Bitwise operators

Bitwise AND, OR, exclusive OR, compliment, right shift and left shift operators

C Preprocessor

Types of C preprocessor directives, Macros, File Inclusion.

Files

File opening modes, Text and Binary files, High level and Low level operations on files, Command Line Arguments.

Reference:
1. Bartee. Thomas, Digital Computer Fundamentals, 6th edition,1995.TMH
2. Mano,Morris M. Computer System Architecture 1986. Prentice Hall India Limited.
3. Rajaraman, V.Fundamentals of Computers, 2nd Edition. Prentice Hall India Limited
4. Kanetkar, Yashavant, Let Us C, 4th Edition, BPB Publications
5. Balagurusamy, E Programming in ANSI C 2nd Edition. Tata McGraw - Hill

CSIP1: C Progarmming Lab

Total Practical Hours/Semester: 45

Part A
1. Program to convert upper case into lower case and vice versa.
2. Program to count the number of occurrences of a charter in a string
3. Program to print the right most digit in a number.
4. Program to count the number of numerals, upper case, lower case and special character in a given string.
5. Program to check whether a string is palindrome or not.
6. Program to find the value of Sin(x)/Cos(x) using mathematical series.
7. Program to check whether a matrix is identity matrix or not.
8. Program to print the transpose of a matrix.
9. Program to find the product of two matrices.

Part B
10. Program to arrange numbers in ascending order.
11. Program to arrange numbers in alphabetic.
12. Program to find the mean, median and standard deviation of numbers of numbers using fuctions.
13. Program to display first N terms of Fibonacci series using recursive functions.
14. Program to find the roots of quadratic equation using macros.
15. Program to demonstrate the use of structure and union.
16. Program to show the difference between call by value and call by reference.
17. Program to demonstrate the use of Files.
18. Program to implement Bitwise operation.

Scheme of Pracitical Examinations:

1. Writing two programs (one from each part)   :10 marks
2. Execution of one program   : 10 marks
3. Practical Record   : 05 marks
4. Viva Voce   : 05 marks
                                    Total   :30 marks