

BSc

DSC-3 A: Computer Concepts and C Programming (LTP::4:0:2) 6 Credits

UNIT I: Programming Concepts and Introduction to C language:

System software, Application software. Program Translators – Assembler, Compiler, and Interpreter. Programming languages -Machine Level language, Assembly level language, High level language.

Program development life cycle: Problem definition, analysis, Design, Coding, Testing and debugging, Documentation and maintenance . Algorithm- Features, simple examples.

Flowchart –Symbols used in a flowchart, suitable examples,

Overview of C: Importance of C, basic structure of C program, executing a C program, sample C program,. Constants, variables and data types. C character set, C tokens, identifiers, constants, variables, declaration of variables, assigning values to variables. Data type conversion.

Operators in C: arithmetic operators, relational operators. Logical operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, precedence of arithmetical expression, relational expression, logical expressions.

UNIT II: Input and output operations:

Input and output statements, reading a character: getchar(), writing a character: putchar(), formatted and unformatted i/o statements.

Control structures:

Branching: if, if-else, nested if, else-if ladder, switch.

Looping : while, do-while and for loop. Jump statements, nested loops.

UNIT III: Arrays, Strings and Functions :

Arrays: Introduction, single dimensional array, two-dimensional arrays, initializing 2-d arrays, multidimensional arrays. Operations on arrays: traversal, insertion and deletion. Searching: linear search & binary search. Sorting: bubble sort, selection sort and insertion Sort.

Strings : Declaring and initializing string variables, reading string from terminal, writing string to screen, putting strings together. Comparison of two strings, length of a string, copying a string, string operations using library functions & User defined functions.

Functions: Introduction, types of functions, need for user-defined functions, function call, types of arguments, nesting of functions, a multi function program, recursion, storage classes.

UNIT IV: Structures ,Unions Pointers and Files

Structures : Definition and declaration of a structure, assigning and accessing the members of a structure, structure initialization, structure elements in memory, comparison of structure variables, structure with in the structure, array within structures.

unions: Definition and declaration, accessing the members of a union. comparison of structure and union.

Pointers : Advantages of pointers, declaration of pointer variable, pointer expressions, pointers and functions: call by value and call by reference, pointers and arrays, array of pointers, pointer to pointer.

Files: Definition, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations, random files.

Texts Books:

1. E. Balaguruswamy : Programming in ANSI C” Tata Mc Graw-Hill
2. Problem Solving with C -PHI(EEE). By - M.T.Somashekara.
3. S. ByronGottfried. : “Programming with C”, Tata McGraw-Hill(2000)
4. Yashawant Kanetkar : “Let us C”
5. Brain Verminghan & Dennis M. Ritchie “ANSI C Programming” (PHI)

BSc

DSC-3 B : Data Structures and File Processing (4:0:2) 6 Credits

Unit-1

Basic data structure : Primitive and non primitive, Abstract data structure, Operations, Data representation, Arrays - Memory representation of one and two dimensional arrays, Stack – Operations, Applications – Recursion, infix to postfix conversion, evaluation of postfix expression, Queues – Operations, Applications, circular queue-Operations, Dequeue, priority queue – uses of priority queues, Linked list - Dynamic memory allocation, Singly linked list – Operations, Circular linked list – Operations, Applications of linked list, doubly linked list – memory representation

Unit-2

Tree – Terminologies, tree properties, binary tree-properties, memory representation – Array and Linked list representation, Binary search tree – Creation through insertion, searching, deletion algorithms, Tree traversal, balanced trees, Applications of binary tree, sets: Dictionary implementation, sets with merge-find operations

Unit-3

Searching and sorting – sequential and binary search, internal and external sorting - bubble, selection, insertion, quick sort and merge sort, heap sort, comparison of different sorting techniques, Memory management : Garbage collection algorithm for equal sized blocks, storage allocation of objects with mixed size, buddy system,

Unit-4

Physical devices : Characteristics of storage devices such as disks, tapes, I/O buffering, basic file system operations – create, open, close, extend, delete, read block and write block, protection mechanism, file organization : sequential, indexed, direct, inverted, multi-list, directory system, indexing using B-tree, B+ tree and their variants, hashing – hash function, collision handling methods, extendible hashing.

Text Books:

1. M.T. Goodrich, R. Tamassia and D. Mount, *Data Structures and Algorithms in C++*, John Wiley and Sons, Inc., 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, *Introduction to Algorithms*, 2nd Ed. Prentice-Hall of India, 2006.
3. E.Horowitz and S.Sahani, *Fundamentals of Data structures*, Galgotia Book source Pvt. Ltd., 2003.