

## U.G. 1<sup>st</sup> Semester

### Paper: CST101C (Core) Fundamental of Computer & C Programming

Credits: 5 = 3+1+1 (48 Lectures)

#### **UNIT I: Fundamentals of Computer [4 lectures]**

Basic concepts of computer organizations. CPU. Memory Unit. Memory Hierarchy, I/O units, Number System Representation.

#### **UNIT II: Introduction to programming languages [8 lectures]**

Evolution of programming languages, structured programming, the compilation process, object code, source code, executable code, operating systems, interpreters, linkers, loaders, fundamentals of algorithms, flow charts.

#### **UNIT III: C Language Fundamentals [6 lectures]**

Character set, Identifiers, Keywords, Data Types, Type Casting, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Bit wise operators, Input-output Assignments, Control structures, Decision making and Branching, Decision making & looping.

#### **UNIT IV: C Functions [8 lectures]**

User defined and standard functions, Formal and Actual arguments, Functions category, function prototypes, parameter passing, Call-by-value, Call-by-reference, Recursion, Storage Classes.

#### **UNIT V: Arrays and Strings [8 lectures]**

One dimensional Array, Multidimensional Array declaration and their applications, String Manipulation.

#### **UNIT VI: Pointers, Structures & Unions [8 lectures]**

Pointer variable and its importance, Pointer Arithmetic, passing parameters by reference, pointer to pointer, linked list, pointers to functions, dynamic memory allocation. Declaration of structures, declaration of unions, pointer to structure & unions.

#### **UNIT VII: File Handling [6 lectures]**

Console input output functions, Disk input output functions, Data files.

#### **Text Books:**

1. Programming in C - Gottfried B.S., TMH
2. The 'C' programming language - B.W. Kernighan, D.M. Ritchie, PHI
3. Programming in C, T. Jayapavan, Vikash Publishing House PVT.LTD

#### **Recommended Books:**

1. Programming in ANSI C - Balaguruswami, TMH
2. C The Complete Reference - H. Schildt, TMH
3. Let us C - Y. Kanetkar, BPB Publications
4. A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, THOMSON Indian Edition
5. Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, OXFORD

### Paper: CST102C (Core) Discrete Mathematics

Credits: 5 = 4+1+0 (64 Lectures)

#### **UNIT I: Sets & Relations [12 Lectures]**

Sets: Types of sets, algebra of sets, Cardinal number in a set, inclusion exclusion principle, power set, intervals, partition of a set, multi sets, ordered pairs, Cartesian product, principles of cartesian product, computer representation of sets; Relations: domain of a relation, range of a relation, types of relations,

properties of relations, equivalence relation, equivalence class, properties of equivalence classes, partitions; partial order relations, closure of relations.

#### **UNIT II: Lattice and Functions [12 Lectures]**

Hasse and lattice diagrams for posets; Special elements in posets: Greatest elements, Least elements, Maximal elements, Minimal elements; Lattice : least upper bounds, greatest lower bounds, Algebra of Lattice, Distributive inequalities, Principle of duality, homomorphic image of a lattice, sub lattice, complete lattice, bounded lattice, complemented lattice, distributive lattice, modular lattice; functions, types of functions, composition of functions.

#### **UNIT III: Graph theory [10 Lectures]**

Basic Definition of graph. Types of Graph, Undirected Graphs, Directed Graphs, connectivity of graph, cut points cycles, Hamiltonian graphs, trees, different characteristic of trees, bipartite graph, Algorithms on graph, Breadth first search, Depth first search.

#### **UNIT IV: Combinatorics [10 Lectures]**

Basic of counting principles, principle of inclusion-exclusion, application of inclusion and exclusion. Pigeonhole principle, generalized Pigeonhole principle and its applications, permutations and combinations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects.

#### **UNIT V: Matrices [10 Lectures]**

Row and column operations, vectors and matrices, partitioning of matrices, representing relations using matrices, Determinant of a square matrix, minor, cofactor, the Cayley- Hamilton theorem, inverse of a matrix, product form of inverse. Rank of a matrix. Solutions of simultaneous linear equations, existence of solutions, solution by Gaussian elimination, Eigen values and Eigen vectors.

#### **UNIT VI: Logic [10 Lectures]**

Connectives, truth tables, Normal forms- CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional calculus. Boolean Algebra. Predicate calculus (only introduction), predicates and quantifiers.

#### **Textbooks:**

1. Discrete Mathematics, S.K. Sarkar, S Chand.

#### **Recommended Books:**

1. Elements of Discrete Mathematics, C. L. Liu, Mc-Graw Hill International Ed.
2. Discrete Mathematics and its Applications, K. H. Rosen, Mc-Graw Hill International Ed.
3. Discrete Mathematics structures with applications to Computer Science, J. P. Tremblay and R. Manohar, Mc-Graw Hill
4. Discrete Mathematics, N. Ch.SN Iyengar, K.A. Venkatesh, V. M. Chandrasekaran, P. S.Arunachalam, Vikash Publishing House Pvt Ltd.
5. Logic for Computer Science, J. H. Gallier, J. Wiley and sons.

**Paper: CST103M (Modular)**

**Fundamentals of Computer**

**Credits: 5 = 3+1+0 (48 Lectures)**

#### **UNIT I: Introduction to Computers [6 lectures]**

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, types of OS.

**UNIT II: Input / Output Devices [3 lectures]**

Input Devices-KeyBoard, Mouse, Output Devices –VDU, Printers, Internet, Multimedia, Computer viruses

**UNIT III: Introduction to Programming Concepts [5 lectures]**

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

**UNIT IV: Memory [5 lectures]**

Memory Hierarchy, Primary Memory-Volatile and non-volatile memory, RAM and ROM and their types, Secondary Memory-Floppy Disk and Hard Disk.

**UNIT V: Number Systems [8 lectures]**

Introduction to Binary, Octal, Hexadecimal system, Conversion, Simple Addition, Subtraction

**UNIT VI: Disk Operating System [8 lectures]**

Introduction to DOS Commands, Types of DOS Commands Wild Card Character in DOS Directory Related Commands. File Related Commands and Utilities

**UNIT VII: Introduction of Windows, Features, Application [13 lectures]**

MS Windows, and its various elements of application windows title bar, menu bar, maximize and close buttons, borders and corners, scroll bars, windows icon, folder icons, dialog box and its items, starting Microsoft windows, searching the files, copying the files, disk clean up, deleting unnecessary files, Determining Free space on disk, disk defragmenter, using scan disk, imaging, character map, calculator, notepad, paint, Word Pad.

**Textbooks:**

1. P .K. Sinha ,Fundamentals of Computers, BPB Publications

**Recommended Books :**

1. V. Rajaraman, Fundamentals of Computers, 3rd Edition , PHI Publications
2. Computer Today- By Suresh Basandra