

B.Sc.101- Computer Fundamental and Architecture

Introduction of Computers: Computer hardware components, Disk Storage, Memory, Keyboard, Mouse, Printers, Monitors, CD etc., and their functions, Comparison Based analysis of various hardware components.

Basic Operating System Concepts: MS-DOS, Windows, Functional knowledge of these operating systems, Introduction to Basic Commands of DOS, Managing File and Directories in various operating systems. Introduction to Networking and internet, Basic terms related with internet, TCP/IP.

Element of a Computer Processing System: Hardware, CPU, Storage Devices and media, VDU, Input-output devices, data communication equipment, Software – System software, application software.

Computer Languages: Classification, low level language, assembly language, higher level language, fourth generation languages.

Representation of information & Basic Building Blocks: Number System- Binary, Octal, Hexadecimal, Character Codes (BCD), SCII, EBCDIC and their conversion. Logic gates, Boolean algebra K-map simplification, Half adder, Full adder, Subtractor, Decoder, Encoder, Multiplexer, Demultiplexer.

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle), Organization of Central Processing Unit, Micro programmed control unit, single organization, general register organization, stack, organization, addressing modes, instruction formats, data transfer and manipulation, I/O organization, Bus architecture, Programming registers.

Memory Organization: Memory hierarchy, main memory (RAM/ROM) chips, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management, magnetic disk and its performance, magnetic tape etc.

I/O Organization: Peripheral Devices, I/O interface, Modes of transfer, Priority interrupt, Direct memory access, Input-Output Processor and Serial Communication, I/O controllers, asynchronous data transfer.

References:

1. Raja Raman V, "Fundamentals of Computers"
2. Sanders D.H., "Computer Today"
3. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia
4. Mano Mirris, "Computer System Architecture" PHI
5. Zaky & Hamacher, "Computer Organization" McGraw Hill
6. B.Ram, "Computer Fundamental Architecture & Organization" New Age
7. Tannenbaum, "Structured Computer Organization" PHI

B.Sc.102- Mathematical Foundation of Computer Science

Relation: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, Recursively defined function.

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions.

Algebraic Structure: Properties, Semi group, monoid, Group, Abelian group properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Propositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

References:

1. Liptschutz, Seymour, "Discrete Mathematics", TMH
2. Trembley, J.P. & R. Manohar, "Discrete mathematical Structure with Application to Computer Science", TMH.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH.
4. Doerr Alan and Lvasseur Kenneth, "Applied Discrete Structure for computer Science", Galgotia Publication Pvt. Ltd.
5. Gersting, "Mathematical Structure for Computer Science", WH Freeman and Macmillan.
6. Kumar RAjendra, "Theory of Automata Language and Computation", PPM.
7. Hopcroft J.E., Uliman J.D., "Introduction to Automata Theory, Language and Computation", Narosa Publication House, New Delhi.
8. C.L. Liu, "Elements of Discrete Mathematics", McGraw Hill.
9. Peter Grossman, "Discrete Mathematics for Computer", Palgrave Macmillian.

B.Sc.103- Programming in 'C'

Programming in C: Features of C and its Basic Structure, Simple C programs, Constants, Integer Constants, Real Constants, Character Constants, String Constants, Backslash Character Constants, Concept of an Integer and Variable, Rules for naming Variables and assigning values to variables, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor.

Operators: Arithmetic Operators, Unary Operators, Relational and Logical Operators, The Conditional Operator, Library Functions, Bitwise Operators, The Increment and Decrement Operators, The Size of Operator, Precedence of operators.

Data Types and Input/Output Operators: Floating-point Numbers, Converting Integers to Floating-point and vice-versa, Mixed-mode Expressions, The type cast Operator, The type char, Keywords, Character Input and Output, Formatted input and output, The gets() and puts() functions.

Control Statements and Decision Making: The goto statement, The if statement, The if-else statement, Nesting of if statements, The conditional expression, The switch statement, The while loop, The do...while loop, The for loop, The nesting of for loops, The break statement and continue statement.

Function: Built-in and user-defined, function declaration, definition and function call, parameter passing, call by value, call by reference, recursive functions.

Arrays and String: One Dimensional Arrays, Passing Arrays to Functions, Multidimensional Arrays, Strings.

Pointers: Basics of Pointers, Pointers and One-dimensional Arrays, Pointer Arithmetic, Pointer Subtraction and Comparison, Similarities between Pointers and One-dimensional Arrays, Null pointers, Pointers and Strings, Pointers and two-dimensional arrays, Arrays of Pointers.

Structures and Unions: Basics of Structures, Arrays of Structures, Pointers to Structures, Self-referential Structures, Unions.

Dynamic Memory Allocation and Linked List: Dynamic Memory Allocation, Allocating Memory with malloc, Allocating Memory with calloc, Freeing Memory, Reallocating Memory Blocks, Pointer Safety, The Concept of linked list, Inserting a node by using Recursive Programs, Sorting and Reversing a Linked List, Deleting the Specified Node in a Singly Linked List.

File Management: Defining and Opening a file, Closing Files, Input/output Operations on Files, Predefined Streams, Error Handling during I/O Operations, Random Access to Files, Command Line Arguments.

References:

1. V. Rajaraman, "Fundamentals of computers", PHI
2. Pater Norton's "Introduction of Computer", TMH
3. Hahn, "The Internet Complete Reference", TMH
4. Gottfried, "Programming in C", Schaum's Series Tata McGraw Hill