

26CSE0101 - Structured Programming Concepts

Credits: 4

L-T-P: 2-0-4

Problem Solving and Logic Development: Problem definition, Problem analysis, General problem-solving strategies, Algorithm design and characteristics, Algorithm development techniques, Flowcharts, Standard Flowchart Symbols, Flowchart Designing implementation, Pseudocode, Difference between Algorithm, Flowchart and Pseudocode, Structured vs Unstructured Programming, Computational Problem Solving.

Introduction to C Programming: History and Features of C, Structure of a C Program, Compilation and Execution Process, Basic C Program, Tokens, Keywords, Identifiers, Variables, Constants, Data Types (including pointers as data type), Basic Input and Output, Escape Sequences, Type Conversion, Coding Standards and Best Programming Practices.

Program Debugging, Testing and Documentation: Compilation Errors, Runtime Errors, Logical Errors, Debugging Techniques, Testing Strategies, Code Readability, Documentation, Code Optimization Basics.

C Program Organization: Modular Programming, Functions as Building Blocks, Header Files, Preprocessor Directives (`#include`, `#define`), Standard C Libraries (`stdio.h`, `stdlib.h`, `string.h`, `math.h`, `ctype.h`, `time.h`).

Operators and Expressions: Arithmetic, Relational, Logical, Assignment, Unary, Increment/Decrement, Conditional, Bitwise, `sizeof` Operator, Operator Precedence and Associativity, Expression Evaluation.

Decision Making: `if`, `if-else`, Nested `if`, `else-if` Ladder, Switch Statement, Conditional Operator, Menu-driven Programming.

Iterative Statements: `while`, `do-while`, `for` loop, Nested Loops, Infinite Loops, `break`, `continue`, `goto` statement, Pattern Programming, Problem Solving using Iteration.

Functions: Function Definition, Declaration, Prototypes, Parameter Passing, Return Values, Scope of Variables, Local and Global Variables.

Storage Classes and Memory Concepts: `auto`, `static`, `extern`, register Storage Classes, Variable Lifetime and Scope.

Arrays: One-Dimensional Arrays, Searching, Basic Sorting, Arrays and Memory, Functions with Arrays, Two-Dimensional Arrays, Matrix Operations.

Strings: Character Arrays, String Input and Output.

Structures and User-Defined Data Types: Structures, Nested Structures, Arrays of Structures, Structures with Functions, `typedef`.