📓 C Programming – Weekend Batch Syllabus

Duration: 3 Months | **Total Hours:** 72 Hours
Schedule: Saturday & Sunday – 3 Hours Each Day
Instructor: _____
Institute: Elementrix Academy

Week 1 – Module 1: Introduction & Setup

- History & characteristics of C
- Setting up compiler/IDE
- Structure of a C program
- Compilation to execution flow
- Algorithm & Flowcharts
- **Hands-on practice programs**

Week 2 – Module 2: Basics: Data Types & Operators

- Keywords, constants, variables, identifiers
- Data types & qualifiers
- Operators: arithmetic, relational, logical, bitwise
- Operator precedence & expressions
- Input / Output (printf / scanf)
- **Practice session + mini programs**

Week 3 – Module 3: Control Flow & Loops

- Conditional statements: if, if-else, nested if
- switch case & menu driven approach
- Loops: for, while, do-while
- break, continue, goto
- **Logical problem-solving exercises**

Week 4 – Module 4: Arrays & Strings – Part 1

- 1D Arrays: declaration, initialization, traversal
- Memory representation
- Basic string handling
- **Practice assignments**

Week 5 – Module 5: Arrays & Strings – Part 2

- 2D Arrays & applications
- Standard string library functions (strlen, strcpy, strcat…)
- **Hands-on coding session**

Week 6 – Module 6: Functions & Modular Programming

- Function declaration, definition, prototype
- Call by value vs address
- Passing arrays to functions
- Recursion
- Understanding **stack frame & function calling mechanism**

Week 7 – Module 7: Storage Classes, typedef & enum

- Storage classes: auto, register, static, extern
- Scope, lifetime & linkage
- typedef for primitive & user-defined types
- enum constants
- **Practice session**

Week 8 – Module 8: Pointers – Basics

- Pointer declaration & usage
- Pointer arithmetic

- Pointer & arrays relation
- Null / wild / dangling pointers
- **Pointer-based exercises**

Week 9 – Module 9: Pointers – Advanced & Memory Layout

- Pointer to pointer
- Function pointers
- Memory layout (stack, heap)
- Padding & memory alignment
- **Practical exercises**

Week 10 – Module 10: Structures, Unions & Memory Layout

- Declaring & accessing structure members
- Array of structures
- Pointer to structure
- Unions and internal memory layout
- **Practice problem solving**

Week 11 – Module 11: Dynamic Memory & File Handling

- malloc(), calloc(), realloc(), free()
- Dynamic arrays (1D/2D)
- File handling: text + binary
- Character I/O & block I/O
- Command line arguments
- **Hands-on activity**

Week 12 – Module 12: Preprocessor + Project + Revision

- Preprocessor directives (#define, #include, #ifdef…)

- Macro expansion & conditional compilation
- Tokenization process
- Final mini-project (includes structures + pointers + file handling)
- **Revision + Doubt clearing + Extra practice buffer time**