**C-Programming Syllabus**

**1. Introduction to C Programming**

* History and Evolution of C
* Features and Applications of C
* Structure of a C Program
* Compiling and Running a C Program

**2. Basics of C**

* Syntax and Keywords
* Data Types
  + int, float, char, double
  + Derived types: arrays, pointers, structures
* Variables and Constants
  + Declaration and Initialization
  + Scope and Lifetime
* Input and Output
  + printf() and scanf()

**3. Operators and Expressions**

* Arithmetic Operators
* Relational and Logical Operators
* Bitwise Operators
* Assignment Operators
* Increment/Decrement Operators
* Operator Precedence and Associativity

**4. Control Flow**

* Decision-Making Statements
  + if, if-else, nested if, else if ladder
  + switch statement
* Looping Constructs
  + for, while, do-while
* Jump Statements
  + break, continue, goto

**5. Functions**

* Function Basics
  + Declaration, Definition, and Calling
  + Function Prototypes
* Parameter Passing
  + Call by Value
  + Call by Reference
* Recursion
* Storage Classes
  + auto, static, register, extern

**6. Arrays**

* One-Dimensional Arrays
* Multi-Dimensional Arrays
* String Handling
  + Standard Functions (strlen(), strcpy(), strcmp(), etc.)

**7. Pointers**

* Basics of Pointers
* Pointer Arithmetic
* Pointers and Arrays
* Pointers to Functions
* Dynamic Memory Allocation
  + malloc(), calloc(), realloc(), free()

**8. Structures and Unions**

* Defining and Using Structures
* Nested Structures
* Arrays of Structures
* Pointers to Structures
* Union Basics and Applications
* Difference Between Structures and Unions

**9. File Handling**

* File Operations
  + Opening and Closing Files
  + Reading and Writing Files
  + fopen(), fclose(), fprintf(), fscanf()
* Modes of File Access (r, w, a, etc.)
* Random Access in Files

**10. Advanced Concepts**

* Command-Line Arguments
* Preprocessor Directives
  + #include, #define, #ifdef, #pragma
* Macros
* Typedef and Enumerations (typedef, enum)
* Bitwise Operations
* Memory Management

**11. Debugging and Optimization**

* Common Errors in C
  + Syntax Errors
  + Logical Errors
  + Runtime Errors
* Debugging Tools
* Code Optimization Techniques