C Programming Course Catalog – 45 Days

Day	Module	Topics Covered
1-2	**Introduction to C Programming**	Overview of C, Setting up the Environment, First Program (Hello World)
3-4	**Variables & Data Types**	Understanding Data Types (int, float, char, etc.), Declaring Variables, Constants
5-6	**Operators**	Arithmetic, Relational, Logical, Bitwise Operators, Operator Precedence
7-8	**Control Structures**	if, else, switch-case, and ternary operator
9-10	**Loops**	for, while, do-while loops, break & continue statements
11-12	**Functions**	Function Declaration, Definition, Calling Functions, Function Arguments & Return Types
13-14	**Arrays**	One-Dimensional Arrays, Multi-Dimensional Arrays, Array Operations
15-16	**Strings**	String Basics, String Functions (strlen, strcpy, strcat, strcmp)
17-18	**Pointers**	Introduction to Pointers, Pointer Arithmetic, Pointers with Arrays, Functions and Pointers
19-20	**Dynamic Memory Allocation**	malloc, calloc, realloc, free, Memory Leaks and Memory Management
21-22	**Structures**	Defining and Using Structures, Nested Structures, Pointers to Structures
23-24	**Unions**	Understanding Unions, Using Unions, Union vs Structures
25-26	**File Handling**	Reading/Writing Files, fopen, fclose, fseek, fprintf, fscanf
27-28	**Preprocessor Directives**	#define, #include, Macros, Conditional Compilation
29-30	**Error Handling**	Handling Errors, Using errno, try-catch concept (manual implementation)
31-32	**Recursion**	Understanding Recursion, Recursive Functions, Solving Problems Recursively
33-34	**Sorting & Searching Algorithms**	Bubble Sort, Selection Sort, Insertion Sort, Linear Search, Binary Search
35-36	**Advanced Pointers & Memory Management**	Function Pointers, Pointer to Pointer, Advanced Memory Handling Techniques
37-38	**Linked Lists**	Introduction to Linked Lists, Insertion, Deletion, Traversing Linked Lists

Day	Module	Topics Covered
39-40	**Stacks & Queues**	Stack Operations, Queue Operations, Implementing Stacks/Queues using Arrays/Linked Lists
41-42	**Multithreading Basics (Optional)**	Introduction to Threads, pthread Library, Synchronization Basics
43	**Project Work**	Hands-on Project (e.g., Mini Calculator, Student Database, etc.)
44	**Debugging & Optimization**	Debugging Techniques, Using gdb, Optimizing Code for Efficiency
45	**Final Review & Certification**	Final Exam, Review of Key Topics, Course Wrap-up & Certification