1. Introduction to C++

A. What is C++?
B. Evolution of C to C++
C. Procedural vs Object-Oriented Programming
D. Features of C++ and Applications
E. Structure of a C++ Program
F. Compilation, Linking, Execution

2. Basic Syntax and Data Types

A. Tokens, Keywords & Identifiers
B. Basic Data Types (int, float, double, char, bool)
C. Variables and Constants
D. Type Conversion & Type Casting
E. Operators: Arithmetic, Relational, Logical, Bitwise
F. I/O using cin, cout

3. Control Structures

A. Decision Making: if, if-else, switch
B. Looping: for, while, do-while
C. Break & Continue
D. Nested Loops

4. Functions in C++

A. Function Definition & Declaration
B. Function Arguments & Return Types
C. Default Arguments
D. Call-by-Value vs Call-by-Reference
E. Inline Functions
F. Function Overloading

5. Classes and Objects

A. Introduction to OOP
B. Defining Classes and Objects
C. Data Members and Member Functions
D. this Pointer
E. Access Specifiers (private, public, protected)

6. Constructors & Destructors

A. Purpose of Constructors
B. Default, Parameterized & Copy Constructors
C. Destructor
D. Constructor Overloading

7. Operator Overloading

A. Overloading Unary & Binary Operators
B. Using Friend Function
C. Overloading << and >> (I/O)

8. Inheritance

A. Concepts of Inheritance
B. Base Class & Derived Class
C. Types of Inheritance (Single, Multi, Hierarchical)
D. Virtual Base Class

9. Polymorphism

A. Compile-time Polymorphism
B. Run-time Polymorphism with Virtual Functions
C. Pure Virtual Functions and Abstract Classes

10. Templates

A. Function Templates
B. Class Templates
C. Template with Multiple Parameters

11. Exception Handling

A. try, catch, throw
B. Standard Exceptions
C. Custom Exception Classes

12. File Handling

A. File Stream Classes

B. Reading & Writing Text Files

C. Binary Files

D. Random Access Files

13. Standard Template Library (STL)

A. Containers (vector, list, map, etc.)

B. Iterators

C. Algorithms (sort, search, etc.)

Practical:

A. Writing and running C++ programs
B. Class and Object based exercises
C. Function overloading & operator overloading
D. Inheritance and polymorphism coding
E. Templates and file I/O programs
F. Mini projects using STL and advanced features