

Dr VirenderKhurana

**Object–Oriented Programming using C++ (24BCA403DS02). DSC**

BCA 3<sup>rd</sup> semester

Object–Oriented Programming using C++

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**18 Weeks Lecture plan**

<b>Week</b>	<b>Topics</b>
1	Introduction to OOP, Procedural vs OOP, Need & Principles of OOP
2	Concepts of Object, Class, Instance, Abstraction, Encapsulation
3	Polymorphism (concept level), Dynamic Binding, Message Passing
4	C++ Basics: Syntax, Structure of C++ Programs, Data Types, Variables
5	Control Structures in C++: Decision Making (if/else, nested if), switch
6	Control Structures: Looping (for, while, do-while), break, continue
7	Classes and Objects: Defining classes, creating objects, scope resolution operator
8	Data Members & Member Functions, Access Specifiers (public, private, protected)
9	Constructors & Destructors: Types, Uses, Default / Parameterized / Copy Constructor
10	Arrays & Strings in C++, Functions with classes (call by value / reference)
11	Pointers and C++ OOP: Object pointer, this pointer, pointer to object, array of objects
12	Inheritance Introduction, Base & Derived Classes, Types of Inheritance – Single/Multiple
13	Multilevel, Hierarchical, Hybrid Inheritance, Access Control in Inheritance
14	Polymorphism in depth: Function Overloading, Operator Overloading
15	Virtual Functions, Dynamic Polymorphism, Pure Virtual Functions, Abstract Classes

<b>Week</b>	<b>Topics</b>
16	Memory Management: new, delete, Object creation at runtime
17	Advanced OOP features: Friend Functions, Static Members, Templates (Basics), Exception Handling
18	Revision + Model Paper Discussion + Previous Year Question Bank Practice

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**SEC101 – Problem Solving Techniques (25BCA401SEC01)**

**BCA 1<sup>st</sup> semester**

**Problem Solving Techniques**

3L : 0T : 4P | 5 Credits

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18 Weeks Lesson Plan – SEC101 Problem Solving Techniques

Week Topics

- 1 Introduction to Computers, Problem Solving, Programming Languages, Evolution, Terminology
- 2 Problem Instances, Generalization, Special Cases, Types of Computational Problems
- 3 Analysis of Problems, Solution Approaches, Algorithm Development Steps, Problem Solving Steps
- 4 Breaking problems into Subproblems, Input-Output Specification, Pre and Post Conditions
- 5 Sequence, Selection, Repetition Concepts (If/Else, While, Do-While), Flowcharts
- 6 Control Structure Stacking and Nesting, Types of Looping Controls
- 7 Standard Algorithm Format, Patterns & Shapes using Loops, Fibonacci and Other Sequences
- 8 Data Types Representation, Real Numbers, 1's & 2's Complement, ASCII, Unicode, Number System Conversions
- 9 Introduction to C Language, History, Structure of C Program, Printf&Scanf
- 10 Operators in C: Arithmetic, Relational, Logical, Assignment, Increment & Decrement Operators
- 11 Conditional Programming in C: If-Else Ladder, Nested If, Switch Case

- 12 Iteration in C: While, Do-While, For, Break & Continue Statements
- 13 Numeric Problems using C: Palindrome, Armstrong, Prime, Perfect, Amicable, Factorial, etc.
- 14 Modular Programming, Top-Down & Bottom-Up Approaches, Recursion
- 15 Arrays in C: 1D & 2D Array operations – Sum, Max, Min, Average, Median, Mode
- 16 Searching & Sorting Techniques – Sequential Search, Binary Search, One Sorting Algorithm
- 17 Debugging Techniques, Good Coding Practices, Functions Prototype & Return Types
- 18 Revision + Final Practical Demonstration + Comprehensive Test