C & C++ Programming

Session 1: C Programming

S. Part 1: Introduction of C Language

1. Techniques of problem solving, Top – down, Bottom- up approaches for problem solving.
2. Divide and conquer principles.
3. Algorithm Development, representation of algorithm.
4. Variable and arithmetic expression, Symbolic constants declaration.
5. Arithmetic operators, Relational and logical operators, Bitwise operators, Assignment operators and type conversion.

S. Part 2: Loops, Arrays and C Functions

1. Conditional Statements and loops: If Statement, If-Else Statement, While loop, Do while, for loop, Nested loops, Infinite loops, Switch Statements.
2. Array: One dimensional array, Array manipulation, Searching, insertion, deletion of an element from an array.
3. Two dimensional arrays: Addition/Multiplication of two matrices.
4. Null strings as array of characters, representation of spare matrices.
5. Library of C functions: Prototype of a Function, Loop parameter list, Return type, function call, Block structure.
6. Pointer: Friend class pointers address operators, Pointer type declaration, Pointer Assignment, Pointer initialization, Pointer Arithmetic, Functions and Pointers, Arrays and Pointers, Pointer arrays.
7. Some exercise of C Programming

Session 2: C++ Programming

S. Part 1: Introduction of C++ Programming

1. C++ Characteristics
   1.1 Object – oriented terminology
   1.2 Polymorphism
   1.3 Abstract Data types, defining Classes in C++
   1.4 Classes and encapsulation
2. Member Functions, Instantiating and using classes.
3. Using Constructors, Multiple Constructors and initialization lists.
4. Using Destruction to destroy instances.
5. Passing arguments to a function: Call by reference, Call by value, Recursive Functions, Arrays as function arguments.

S. Part 2: Working with Overloaded Operators

1. Operator overloading
   1.1 Method initialization and assignment
   1.2 The Copy constructor
   1.3 Assigning values
   1.4 Specialized Constructors and methods
   1.5 Constant and Static class members
2. Storage Management Memory Allocation.
3. Dynamic Allocation: New and Delete.

S. Part 3: Overview of Inheritance

1. Inheritance: Defining base and derived classes.
2. Constructor and destructor calls Polymorphism.
3. Overview of Polymorphism: Input and Output in C++ Programs standard streams.
4. Manipulators, Unformatted Input and Output.
5. File Input and Output.

Book References

1. E. Balaguruswamy “Let Us C”.
2. Herbert Schildt “The Complete Reference of C++”
3. E. Balaguruswamy “Object Oriented Programming with C++”.