Course Code: PGDCA 103, 03/MSCCS-103, 03/MCA-103
Course Name: OOPS Programming with C++ and Java

Unit 1: Object Oriented Programming Concepts
Programming Methodology, Evolution of OOPS, Definition of Object Oriented Programming: Object Oriented Programming Systems. What is Object Oriented Programming?, OOP Terminology, Class and Objects, Inheritance, Polymorphism, Dynamic Binding.

Unit 2: Simple Programming in C++
Introduction, Basic Data Type: Variable, Identifier, User Defined Data Type, Derived Data Type, Memory Management: Typecast Operator.

Unit 3: Control Structure and Function in C++
Control Structure: Conditional Structure, Loop Structure, Jump Statement, The goto Statement, The Selective Structure, Main Method, Function Prototyping, Parameter Passing: Call By Reference, Default Argument, Const Argument.

Unit 4: Class and Objects
Introduction to Structure: Structures in C, Structures in C++, Classes in C++ : Declaring Classes, Using Objects, Accessing Members, Access Specifiers: The Public Keyword, The Private Keyword, The Protected Keyword, Characteristics of Class Member, Defining Member Function, Memory Usage By Members, Static Member Variables, Static Member Functions, Object Usage: Static Object, Array Object, Constructor and Destructor: Constructor Properties, Destructor Properties.

Unit 5: Function and Operator Overloading
Introduction, Function Overloading: Principles of Overloading, Precaution with Overloading, Operator Overloading: Overloading Fundamental, The Keyword Operator, Overloading Unary Operators, Operator Return Type, Constraint On ++ and – Operators, Overloading Binary Operators, Overloading with Friend Function, Type Conversion, Rule For Operator Overloading.

Unit 6: Inheritance, Polymorphism and Virtual Function
Inheritance Basics: Protected Members, Inherited Members, Types of Inheritance, Polymorphism using Virtual, Rules of Virtual Function, Pure Virtual Function Derived Class Properties: Constructor and Destructor, Object as a class Member, Pointer to Derived Class Objects, Array of Pointers.

Unit 7: Pointers Arrays and Memory
Introduction Pointers: Pointer Declaration, void Pointers, Pointer to Class, Pointer to Objects, this Pointer, Pointer to Derived Class and Base Class, Pointer to Members, Accessing Private Member with Pointer, Direct Access to Private Member, Address of Object and Void Pointer, Array: Characteristics of Array, Array of Classes, Memory Models, New and Delete Operator, Heap Consumption, Overloading New and Delete Operators, Execution Sequence of Constructors and Destructors, Specifying Address and Objects, Dynamic Objects and Calling Conventions.

Unit 8: Input, Output and File Handling
Stream in C++, Predefined streams classes, Formatted and Unformatted data, Input and Output Streams, Type Casting with cout statement, Member functions of istream class, Formatted console I/O operation, Bit field, Manipulators, File stream classes, Steps of file operation, Checking for errors, Finding end of file, File opening modes, File pointers and manipulators, Manipulator with arguments, Sequential read and write operation, Error handling functions, commanded line arguments.

Unit 9: Generic Programming with Template

Introduction, Need of Template, Definition of Class Templates, Function Template: Normal Function Template, Working with Function Template, Class Template with Parameter, Overloading of Template Function, Recursion with Template Function, Class Template with Overload Operators, Class Template and Inheritance, Guidelines For Templates, Difference Between Template and Macro, Linked List with Template.

Unit 10: Introduction to Java Programming

Key Feature of Java, Java Applet and Application: Applet Element, Applet Life Cycle, Java Token, Keywords, Java Comments, Java Data Types and Variables, Literal and Array, Operator and Their Precedence, Flow Control Statement: Block and Statement, Conditional Expression, Looping Expression: While, Do While, For, Break, Continue, Labelled Loop, Class Fundamentals: Declaring Class and Creating Object, Methods, Invoking Methods, Constructor, Garbage Collection.

Unit 11: Overloading and Inheritance

Introduction, Reference to Objects, Usage of Final and Static Keyword, Access Control of Methods, Inner Classes, Command Line Arguments, Inheritance Basic, Using Superclass Variable and Constructor, Dynamic Method Dispatch, Method Overriding, Abstract Classes.

Unit 12: Packages and Interfaces

Packages: Accessing Packages, Package Naming Conventions, CLASSPATH: Environment Variable, Defining an Interface, Implementing an Interface, Using an Interface as Data Type, Implementing Multiple Interfaces, Extending an Interface, Usage of Abstract Class.

Unit 13: Exception Handling

Exception Fundamentals: Need of Robust Programming, Exception Conditions, Exception Handling, Exception Classes: Checked Exceptions, Unchecked Exceptions, Exception Catching: Using Try and Catch, Multiple Catches, Nested Try, Using Throws, Using Throw, Using Finally, Programmer Defined Exceptions.

Unit 14: Multithreading

Introduction to Multithreading, Thread Life Cycle: Newborn State, Runnable State, Running State, Blocked State, Dead State, Thread Priorities and Scheduling: MIN_Priority, NORM_ Priority, MAX_ Priority, Creation and Execution of a Thread: Extending The Thread Class, Implementing The Runnable Interface, Thread Synchronisation, Messaging, Thread Class and Runnable Interface, Interthread Communication, Deadlock, Suspending, Resuming and Stopping a Thread.

Unit 15: Applet and GUI

Applet Fundamentals: Definition, creation and compilation of Applet, Applets Life Cycle: Born or Initilazaton State, Running State, Idle State, Destroyed State, Major Applet Activities, Passing Parameter to Applets, Metords using GUI components: Label Button, Check Box, Lists, Text Field Text Area, Understanding Layout Manager: Flow Layout, Border Layout, Card Layout.

Unit 16: Event Handling

The concept of Event Handling, Event Handling Mechanism: The Delegation Event Model, Events, Event Source, Event Listerners, Event Classes: The Action Event Classes, The focus Event Classes, The Item Event Clasees, The Mouse Event Classes, The Text Event Classes. The source of Events, The Events Listeners Interfaces: The Action Listeners, The Focus Listeners, The Mouse Listeners, The Mouse Motion Listeners, Handling the Mouse Events. Adapter Classes.