# Object Oriented Programming using JAVA

**Subject Code : 18CSI302** **Total Contact Hours: 45**
**Credits : 03** **L-T-P: 3-0-0**

**Prerequisite:** Knowledge on problem solving skills and programming constructs.

**Course Objectives:**

- This course aims at imparting expertise in development of Object Oriented Concepts using JAVA JDK.
- As part of the course, students will implement GUI applications using JAVA swings and create custom packages and interfaces.

**Unit I:** **(9 hours)**

**Introduction to Object Oriented Programming:** Basic components of Object Oriented programming: Classes, Objects, Abstraction, Inheritance, Polymorphism, Encapsulation, Advantages of Object oriented programming over Procedural oriented programming.

**Getting started with JAVA:** Evolution and Features of Java, First Java program, Edit-Compile-Run cycle, Java environment, Keywords, Identifiers, Literals, Data types, Operators, Type Casting.

**Program Control Statements:** Selection statements: if, switch; Iteration statements: for, while, do-while; Jump statements: break, continue, and return.

**Arrays:** Declaration, Creation and Initialization: One-dimensional arrays, Multidimensional Arrays and Variable length arrays, processing arrays.

**Unit II:** **(9 hours)**

**Defining your own classes, Objects and Methods:** Class Fundamentals, How Objects are Created, Reference Variables and Assignment, Methods, Returning from a Method, Returning Value, Using Parameters, Constructors, Parameterized Constructors, new operator, Overloading Methods and Constructors, controlling access to class members, Call-By-Value and Call-By-Reference, Returning Objects, Recursion, static keyword, Introducing Nested and Inner Classes, Garbage Collection and Finalizers, this Keyword.

**Inheritance, Polymorphism, Abstraction:** Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call Superclass constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, When are Constructors Executed, Superclass References and Subclass Objects, Method Overriding, Overridden Methods support polymorphism, why Overridden Methods, Using Abstract Classes, Using final, The Object Class.

**Unit III:** **(9 hours)**

**String Handling:** Mutable and Immutable Strings, String class, String Constructors, Operations on strings, StringBuffer class, StringBuffer constructors, Operations on StringBuffer, Programming examples.

**Exception Handling:** The Exception Hierarchy, Exception Handling Fundamentals, The Consequences of an Uncaught Exception, using Multiple catch clauses, Catching subclass

Exceptions, try blocks can be nested, Throwing an Exception, using finally, using throws clause.

**Unit IV: (9 hours)**

**Interfaces:** Interface Fundamentals, Creating an Interface, Implementing an Interface, Using Interface References, Implementing Multiple Interfaces, Constants in Interfaces, Interfaces can be extended, Nested Interfaces.

**Packages:** Package Fundamentals, Packages and Member Access, Importing Packages, Static Import.

**Multithreaded Programming:** Multithreading fundamentals, Creating threads using Thread Class and Runnable Interface, Creating Multiple Threads, Determining When a Thread Ends, Thread Priorities, Synchronization, using Synchronization Methods, The Synchronized Statement, Thread Communication using notify(), wait() and notify All(), suspending, Resuming and stopping Threads.

**Unit V: (9 hours)**

**Enumerations, Auto boxing and Annotations:** Enumerations, Java Enumeration are class types, The Values () and Value of () Methods, Constructors, methods, instance variables and enumerations, Auto boxing, Annotations (metadata)

**Generics:** Generics Fundamentals Bounded Types, Generic Methods, Generic Constructors, And Some Generic Restrictions.

**Streams:** I/O streams, Stream Classes: Byte streams, Character streams, using stream I/O, serialization.

**Swing Fundamentals:** The origin and design philosophy of swing, components and containers, layout managers, simple swing Example, event handling, exploring Swing Controls.

**Course Outcomes:**

At the end of the course, students will be able to:

- Implement Object Oriented Programming concepts.
- Design a GUI using Java programs and Applets.
- Develop Multithreaded Applications.
- Creating Custom Packages and Interfaces.

**Text Books:**


1. JAVA fundamentals, a comprehensive introduction by Herbert Schildt, Dale Skrien. Tata McGraw Hill Edition.
2. Object Oriented Programming and Java by Danny Poo, Derek Kiong, Swarnalatha Ashok, Springer


**Reference Books:**


1. O'Reilly Head First JAVA, 2nd Edition by Kathy Sierra and Bert Bates.
2. Core and Advanced JAVA, Black Book, DreamTech Press
3. JAVA 6 programming, Black Book, KoGenT, Dreamtech