Core Java (J2SE)

Objective: To write the console and windows based application using Core Java (J2SE).

Pre-requisites: To know the basic fundamentals of object oriented programming language

Session 1 (Introduction to Java)

- ➢ Why Java and its Paradigms
- ➢ Java Programming Format
- ➢ Difference between Java and Others (C, C++)
- ➢ Types of Application
- ➢ Java History and Features

Session 2 (Installation and First Program)

- ➢ How to install Java, Environment Variables, JVM Architecture
- ➢ JDK and its usage (Java Compiler, Java Runtime, Java Debugger, Javadoc)
- ➢ Difference between applications and applets
- ➢ Java Program Development, Java Source File Structure
- ➢ Java Program Compilation and Execution (Via CMD and Eclipse and NetBeans)

Session 3 and 4 (Basics of Java Programming)

- ➢ Data Types, Variables, Keywords and Identifiers
- ➢ Expression, Operators, Naming Convention in Java

Session 5 and 6 (Control Flow)

- ➢ Selection Statements: Simple if statement, The if-else statement, The switch statement, Nesting of selection statements
- ➢ Transfer Statement, The break statement, The return statement, Labelled Statement, The Continue Statement
- ➢ Iteration Statements: The while statement, The do-while statement, The for(;;) statement, The foreach statement

Session 7 and 8 (Arrays)

- ➢ Defining an Array
- ➢ Multi-Dimensional Array
- ➢ Initializing and Accessing Array

- Jig-Jag Array and Command Line Arguments

Session 9 and 10 (java.lang Package)

- System class (Taking input from console)
- Math class (How to generate a random number)
- Wrapper classes
- Object class
- String, StringBuilder, StringBuffer and StringTokenizer

Session 11 to 20 (OOPs Concepts)

- Class, Object and Instances, OOPS and its benefits
- Access Specifiers, Static Keyword, Constructors and chaining using this()
- Polymorphism (Overloading and Overriding)
- Encapsulation and Interfaces
- Garbage Collection, Object Lifetime
- Initialization Blocks, Memory Management
- Inner Classes (Member Inner Class, Static Inner Class, Local Inner Class and Anonymous Inner Class)
- Variable Length Argument Function
- Inheritance, The super keyword
- The "this" keyword, Non-static/instance members and functions
- Abstraction, Abstract classes, Reachable Objects, Package
- Organizing Classes and Interfaces in Packages
- Packages as Access Protection
- Defining Package
- CLASSPATH setting for Packages
- Compilation of package classes

Session 21 and 22 (Exception Handling)

- Exception and Errors
- Types of Exception and Exception classes
- Use of try, catch, finally, throw, throws in Exception Handling
- Exception Handling Mechanism
- Creating Your own Exceptions

Session 23, 24 and 25 (File & Stream Handling – java.io package)

- Input and Output, The File Class, Byte Streams

- Character Streams, Object Serialization

Session 26 to 29 (Multithreading)

- Multithreaded Programming in Java
- java.lang.Runnable and java.lang.Thread
- Thread Life Cycle
- Synchronization
- Multithreading: Advantages and Issues
- Thread Creations
- Life Cycle Methods
- Wait(), notify(), notifyall() methods

Session 30 to 34 (Collections and Maps)

- Java Generics, Collection Classes (Stack, Vector, Hashtable, Enumeration)
- List and Subtypes
- Set and Subtypes
- Introduction to Collection
- Collection Interfaces and classes
- Map and Subtypes
- Various Utility classes (Date, Time, Calendar, Scanner etc.)
- Miscellaneous Topics

Session 35 to 38 (AWT – Abstract Window Toolkit)

- Introduction to AWT, Individual Components Label, Button, CheckBox, RadioButton
- Choice, List, Menu, TextField, TextArea
- Layouts, Listeners and Event Handling

Session 39 to 41 (Swing)

- Introduction to Swing, Difference between AWT and Swing
- Component Hierarchy, Panes
- Individual Swing Components JLabel, JButton, JTextField, JTextArea
- Listeners and Event Handling
- JScrollPane, JTable

Session 42 (Applet Programming)

- The Applet Class, Passing Parameters, Embedding in HTML
- Applet Context, paint(), repaint(), update(), getGraphics()

- ➢ Integrating into distributed application
- ➢ Running applet using command prompt

Session 43 to 44 (Networking)

- ➢ Introduction to Networking Fundamentals
- ➢ TCP/IP and UDP
- ➢ Socket and Server Socket
- ➢ Client-Server Communication
- ➢ URL, InetAddress
- ➢ Datagram Packets and Datagram Sockets

Session 45 (Reflection API)

- ➢ Introduction to Reflection API
- ➢ Reflection Methods to get information about class modifiers, fields, methods, constructors, super classes etc.

Session 46 (End Project Development)

- ➢ Requirement Analysis
- ➢ Working with Packages
- ➢ Designing and Testing