

Java Technologies (J2SE and J2EE)

Objective: To develop the Console Based, Windows Based, Web Based Application using Java Frameworks.

Pre-requisites: To familiarize with the basic fundamentals of C, C++ Languages

Session 1 (Introduction to Java Programming)

- Why Java and Its Paradigms
- History of Java and Its Features
- Java Programming Format
- Difference between Java, C and C++
- Types of Java Applications

Session 2 (Installation and First Program)

- How to Install JAVA
- Environment Variable
- 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 or NetBeans

Session 3 (Basics of Java Programming)

- Datatypes, Variables, Keywords and Identifiers
- Operators, Expressions
- Naming Convention in Java

Session 4 (Control Structure and Its Flow)

- Selection Statements: Simple If Statement, The if-else statement
- The Switch Statement, Nesting of Selection Statements
- Iteration Statements: The While Loop Statement, The do-while loop statements
- The For Loop Statements
- The Extended For Loop Statements
- Transfer Statement, The Break Statements
- Labelled Statement, The continue Statement

Session 5 (Arrays)

- Defining an Array
- Multi-Dimensional Array
- Initializing and Accessing Array
- Jig-Jag (Jagged) Array and Command Line Arguments

Session 6 (java.lang Package)

- System class (Taking Input from Console)
- Object class
- Math class (How to generate a random number)
- String, StringBuffer, StringBuilder and StringTokenizer
- Wrapper Classes

Session 7 (OOPS Concepts)

- Class, Object and Instances
- OOPS and Its Benefits
- Access Specifiers, Static Keyword, Constructor and Chaining using this()
- Polymorphism (Overloading and Overriding)
- Encapsulation and Interfaces
- Initialization Blocks
- Inner Classes (Member Inner, Static Inner, Local Inner and Anonymous Inner)
- Memory Management
- Inheritance, The super keyword, The "this" keyword, Non-static/instance members
- 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 8 (Exception Handling)

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

Session 9 (File and Stream Handling – java.io package)

- Input and Output, The File Class
- Byte Streams, Character Streams
- Object Serialization

Session 10 (Multithreading)

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

Session 11 (Collections and Maps)

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

Session 12 (AWT – Abstract Window Toolkit)

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

Session 13 (Swing)

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

Session 14 (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 15 (Networking)

- Introduction to Networking
- Socket and ServerSocket
- URL, InetAddress
- TCP/IP and UDP
- Client-Server Communication
- Datagram Packet and Datagram Socket

Session 16 (Reflection API)

- Introduction to Reflection API
- Reflection methods to get information about class modifiers, fields, methods
- Constructors, super classes

Session 17 (JDBC – Java Database Connectivity)

- Introduction to JDBC
- JDBC Architecture, Types of Drivers
- Statement and ResultSet
- PreparedStatement and Connection
- Save Point and Batch Updates
- CallableStatement and BLOB and CLOB
- Project Development

Session 18 (Java Mail)

- Introduction to Java Mail API
- Configuring JAVA Mail API and Sending and Receiving Mails
- Send Mails with Attachments using Java API

Session 19 (Servlet)

- Introduction: What and Why?
- Web Application Architecture
- Web Application Development
- HTML-SERVLET Communication

- Container Life Cycle
- Servlet to DB Communication
- Session Tracking: Cookies, Hidden Fields, URL Rewriting, HttpSession
- Servlet Listeners
- Annotations based servlet programming
- Web Server and Containers
- HTTP Protocols
- Understanding Servlet API
- Servlet Life Cycle
- Deployment of Web Application
- Servlet to Servlet Communication
- Servlet Filters and Wrappers
- File Uploading and Downloading
- Web Security

Session 20 (JSP – Java Server Pages)

- Introduction to JSP
- JSP Implicit Objects and Scopes
- JSP Directive Tags
- JSP Using JavaBeans and JSTL
- JSP with AJAX
- JSP Lifecycles
- JSP Scripting Tags
- JSP Action: Standard Actions, Custom
- Custom Action and Tag Libraries in JSP
- Understanding MVC Architecture
- Implement MVC based web application using servlet, JSP and JavaBeans
- Session Tracking – Cookies, Hidden Form Fields, URL Rewriting and HttpSession
- Project Development

Session 21 (EJB and RMI)

- Overview on the J2EE Architecture
- The EJB Model
- The Services of the Application Server
- Developing Session Beans – Stateless Session Beans, Stateful Session Beans
- Packing and Writing
- Introduction to RMI, RMI Execution Flow, RMI with Database

Session 22 (Hibernate)

- Hibernate Introduction
- Hibernate Architecture
- Understanding First Hibernate
- Hibernate with Annotation
- Hibernate with Web Application
- Hibernate Generator Classes
- Hibernate Dialects, Hibernate Configuration and Mapping
- Hibernate Relations – One to One, One to Many, Many to One, Many to Many
- Hibernate Query Language (HQL)

Session 23 (Struts)

- Introduction: What and Why?
- Struts Architectures
- Steps to create Struts 2 Application
- Understanding Action Class
- Understanding struts.xml, web.xml files
- Core Components – Interceptors, Action Invocations, Action Interface
- Action Support Class
- Building Web Pages using Struts 2 and Servlet
- Struts and Hibernate Configurations
- Abstract Classes and Project Development

Session 24 (Spring Framework)

- Why Spring?
- Overview of Spring 3 Architecture
- Spring Module Overview
- Spring MVC Architecture
- Understanding Spring 3 Annotations
- Spring Applications
- Multiple Controller
- Request, Response
- MVC Form Example, MVC CRUD Example
- Development of Web Application using Spring MVC Module
- Integration of Spring Module with Hibernate
- Web Services using Spring
- Project Development

Session 25 (Spring Boot)

- What is Micro Service, Prerequisites
- What is Spring Boot, How does it work
- Spring Boot Starters, Auto Configuration, Spring Boot Application
- Spring Initializer, Class Path Dependencies, Main Method, Write a Rest Endpoint
- Create an Executable JAR
- Run Hello World with Java
- Dependency Management, Maven Dependency

Session 26 (Building Restful Web Services)

- Rest Controller, Request Mapping
- Request Body, Path Variable
- Request Parameter
- Restful APIs

Session 27 (ThymeLeaf)

- Thymeleaf Templates
- Web Application

Session 28 (Database Handling)

- Introduction to MongoDB and NoSQL
- Data Modelling in MongoDB
- Advantages of NoSQL over SQL
- Connection to MongoDB
- Introduction to JSON/BSON
- Backup Strategies
- MongoDB Security Concepts
- SpringBoot MongoDB Document File

Session 29 (Project Development)

- Requirement Analysis
- Designing Templates
- Designing Database
- Make Your Project Dynamic with J2EE
- Working with MVC Architecture
- Hosting of Project, Working with FTP
- Debugging with developer tools of browser