

JAVA
Instructor: Sanjay Madaan

Course Pre-requisites:

- Basic skills of programming language.
- C++ or any other Object-Oriented language.

Course Description:

The subject provides understanding to the students to learn and use the concepts of Object Oriented Programming, Multithreading, IOStream, Collection Framework, JDBC, Servlets/JSP, ORM, Hibernate, Spring, SpringBoot, RESTful.

Pedagogy / Andragogy / Heutagogy

This course is designed to achieve its aim through a combination of lectures, labs, logic building, assignments, and mini projects.

Software Requirements:

- Eclipse - Integrated Development Environment(IDE) - [Download Link](#)
- Java Runtime Environment-8 ([Download Link](#)) and Java Development Kit-8 ([Download Link](#)) should be installed on your system.

Installation Links:

Installation of the JDK and the JRE on

1. Microsoft Windows Platforms
2. Linux Platforms
3. macOS

Course Content:

Modules	Topics Coverage
Module 1	<p>Introduction to Java: Introduction, Application areas of Java, Platform Independency in Java, Java Features, Difference between JDK, JRE, JVM, JVM Architecture, Installing Java on Windows, Understanding Path Variable: Why Set Path, Java coding standards.</p> <p>OOPS using Java: Class, Object, Reference Variable, Constructors, Instance (Non-Static) & Static Variables, Instance (Non-Static) & Static Methods, this Keyword and its usages, Object & Static Initializers (Anonymous Blocks), Understanding '+' Operator, Array. Classes: Inner classes and types, Abstract classes, Inheritance, Polymorphism, Encapsulation, Interfaces, Methods (types and Overloading/Overriding), Blocks (Static block, Instance Initializer block).</p> <p>Exception Handling: Understanding Exceptions, Exception Hierarchy, try and catch blocks, Nested try statements, throw, throws, finally, Creating Custom Exceptions, Checked & Unchecked Exceptions.</p> <p>Wrapper/String Classes: Methods of wrapper classes: Byte, Short, Integer, Long, Float, Double, Boolean, Character. Autoboxing and Unboxing. String, StringBuffer, StringBuilder, StringJoiner classes and its methods.</p>
Module 2	<p>Collection Framework: Introduction to Collection Framework, Collection Hierarchy. List: ArrayList, LinkedList; Set: TreeSet, HashSet; Map: HashMap, TreeMap; Comparable and Comparator Interface.</p> <p>Multithreading: Multithreading in Java, Thread LifeCycle, Thread Synchronization (Synchronized method, Synchronized block, Static synchronization), Deadlock in Java, ThreadGroup in Java.</p> <p>IO package: What is I/O, Why Need Streams, Byte Streams and Character Streams, Read/Write operations with file, Scanner Class, Object Serialization & Deserialization, Transient keyword, File Class and its Methods.</p> <p>JDBC: Database connectivity, Types of Drivers for connection, Connection Example. CRUD operations using Database using Statement/</p>

	PreparedStatement/CallableStatement interface. JDBC – joining of tables and applying criteria, Configuring various types of drivers for Java Database Connectivity, Sequence, Dual table.
Module 3	<p>Java 8 features: Lambda Expressions, Method References, Functional Interfaces, forEach() method, StringJoiner class.</p> <p>Servlets, JSP and JSTL: Servlet Lifecycle, Generic Servlet, Http Servlet, Linking Servlet to HTML, HttpServlet Request and Response, Servlet with JDBC, Configuring project using servlet, Servlet Config and Servlet Context, File Uploading and Downloading, Session Tracking & State Management: Cookie, Url Rewriting, Hidden Form Field, Session Object.</p> <p>JSP: JSP declaration tag, JSP directives tag, JSP Scriptlets tag, JSP include tag, JSP page tag, Building web forms with JSP, Handle Sessions in JSP, MVC in JSP.</p> <p>JSTL (JSP Standard Tag Library): Core Tags, Function Tags, Formatting Tags, XML Tags, SQL Tags.</p>
Module 4	<p>ORM: Need of ORM, Problems using JDBC Directly, ORM Implementation, Maven Configuration, and Converting Maven to Eclipse.</p> <p>Hibernate: Introduction, Architecture, Hibernate using Annotations and XML, Hibernate Mapping (One-to-One, One-to-Many, Many-to-One, Many-to-Many), Collection Mapping in Hibernate: List, Set, Map, Hibernate Caching (First Level Cache, Second Level Cache).</p>
Module 5	<p>Spring: Introduction, Spring Modules, Spring Framework, Understanding Dependency Injections (Constructor Injection, Setter Injection), Spring JDBC Template: PreparedStatement, ResultSetExtractor, RowMapper, NamedParameter, SimpleJdbcTemplate, Spring ORM.</p> <p>Spring MVC: MVC Introduction, Multiple View Page, Multiple Controller, Model Interface, RequestParam Annotation.</p>
Module 6	Spring Boot: Introduction to Spring Boot, Spring MVC, RESTful: Spring Boot, Spring Boot JDBC.

Suggested Certifications:

Coursera Courses:

Name of Courses	Offered By	Duration
Introduction to Java	Learn Quest	1 Week
Introduction to Java and Object-Oriented Programming	University of Pennsylvania	1-4 Weeks
Object Oriented Programming in Java Specialization	DUKE University	3-6 Months
Core Java Specialization	LearnQuest	3-6 Months
Java Programming and Software Engineering Fundamentals Specialization	DUKE University	3-6 Months
Java Servlet Pages (JSPs)	LearnQuest	1-4 Weeks
Become a Spring Developer	LinkedIn Learning	1-4 Weeks
Spring Boot 1.0 Essential Training	LinkedIn Learning	1-4 Weeks