

## 1. Introduction to Full Stack Development

- Overview of Full Stack Development
- Client-Side, Server-Side, and Databases
- Role of Full Stack Developer
- Tools and Technologies Overview (Java, Spring Boot, Angular/React, MySQL/PostgreSQL)

## 2. Front-End Development

### *HTML & CSS*

- Introduction to HTML5
  - HTML Elements and Attributes
  - Semantic HTML
  - Forms and Input Validation
- Introduction to CSS3
  - CSS Selectors, Box Model, Layout Techniques
  - Flexbox, Grid, Responsive Design
  - CSS Frameworks (Bootstrap, Tailwind CSS)

### *JavaScript*

- JavaScript Fundamentals
  - Variables, Data Types, Operators
  - Control Flow: if-else, switch, loops
  - Functions, Objects, Arrays
- DOM Manipulation
  - Events Handling, DOM Traversing, and Manipulating Elements
  - ES6+ Features (Arrow Functions, Template Literals, Let/Const, Promises)
  - Asynchronous JavaScript (Callbacks, Promises, Async/Await)

### *Front-End Framework (Angular or React)*

#### *Angular:*

- Introduction to Angular
- TypeScript Basics
- Angular Components, Templates, and Data Binding
- Services and Dependency Injection
- Routing and Navigation
- HTTP Client Module (REST API Integration)
- Forms in Angular (Template-driven and Reactive)
- Angular Directives and Pipes
- State Management (NGRX)

- Testing Angular Applications

## React:

- Introduction to React
- JSX Syntax and Rendering
- Functional vs. Class Components
- Component Lifecycle and Hooks (useState, useEffect)
- React Router for Navigation
- Handling Forms and Form Validation in React
- State Management (Redux or Context API)
- Integrating REST APIs with Fetch/Axios
- Testing React Components (Jest, Enzyme)

## 3. Back-End Development

### *Core Java*

- Introduction to Java
- Object-Oriented Programming (OOP) Concepts
  - Classes, Objects, Inheritance, Polymorphism, Abstraction, Encapsulation
- Exception Handling
- Collections Framework (List, Set, Map)
- Multithreading and Concurrency
- Java I/O (File Handling, Serialization)
- Java 8+ Features (Lambda Expressions, Streams, Functional Interfaces)

### *Java Web Development (JSP, Servlets)*

- Introduction to Web Architecture (MVC Pattern)
- Java Servlets Overview
- Request/Response Handling in Servlets
- Java Server Pages (JSP)
- JSP Tags and Directives
- Session Management in JSP/Servlets
- Deployment on Tomcat

### *Spring Framework*

#### *Spring Core*

- Introduction to Spring Framework
- Dependency Injection and Inversion of Control (IoC)
- Bean Lifecycle and Scopes
- Spring AOP (Aspect-Oriented Programming)

## Spring Boot

- Introduction to Spring Boot
- Spring Boot Annotations (Controller, Service, Repository)
- Creating RESTful APIs with Spring Boot
- Spring Boot Data JPA (Connecting to Databases)
- Spring Boot Security (JWT, OAuth2)
- Exception Handling in Spring Boot
- Unit Testing in Spring Boot (JUnit, Mockito)

## *Spring Data JPA and Hibernate*

- Introduction to ORM (Object-Relational Mapping)
- JPA Annotations (@Entity, @Table, @Id, @One To Many, etc.)
- CRUD Operations with Spring Data JPA
- Hibernate Relationships (One-to-One, One-to-Many, Many-to-Many)
- JPQL (Java Persistence Query Language)
- Hibernate Caching and Performance Optimization

## 4. Database Management

### *SQL (MySQL/PostgreSQL)*

- Introduction to RDBMS
- SQL Queries (SELECT, INSERT, UPDATE, DELETE)
- Joins, Group By, Aggregate Functions
- Normalization and Denormalization
- Indexing and Constraints (Primary Key, Foreign Key)
- Writing Complex Queries (Subqueries, CTEs)
- Database Transactions and ACID Properties

### *NoSQL (MongoDB)*

- Introduction to NoSQL Databases
- MongoDB Installation and Setup
- MongoDB Data Model (Documents, Collections)
- CRUD Operations in MongoDB
- Aggregation Framework in MongoDB
- Indexing in MongoDB
- MongoDB with Java (Spring Data MongoDB)

## 5. RESTful API Development

- REST Principles and Constraints
- Building RESTful APIs with Spring Boot

- HTTP Methods (GET, POST, PUT, DELETE)
- URL Structuring, Query Parameters, Path Variables
- Request/Response Structure (Headers, Status Codes)
- Consuming REST APIs with Front-End Frameworks (Angular/React)
- API Documentation using Swagger/OpenAPI

## 6. Micro services Architecture

- Introduction to Micro services Architecture
- Monolithic vs. Micro services
- Creating Micro services with Spring Boot
- Service Discovery with Eureka
- API Gateway with Spring Cloud Gateway/Zuul
- Circuit Breaker Pattern (Hystrix)
- Centralized Configuration with Spring Cloud Config
- Micro services Communication (REST, gRPC, Messaging)
- Docker zing Micro services and Deployment
- Testing Micro services

## 7. Version Control with Git and GitHub

- Introduction to Version Control Systems (VCS)
- Git Basics (Clone, Commit, Push, Pull, Branch)
- Resolving Merge Conflicts
- Git Workflow (Feature Branching, Forking, Pull Requests)
- Collaborating on GitHub (Repositories, Issues, Wiki)

## 8. Build Tools and Dependency Management

- Introduction to Maven and Gradle
- Dependency Management with Maven (pom.xml)
- Multi-Module Maven Projects
- Creating and Managing Build Configurations
- Continuous Integration with Jenkins

## 9. DevOps and Deployment

- Introduction to DevOps Practices
- Continuous Integration/Continuous Deployment (CI/CD)
- Docker for Containerization
- Building Docker Images for Java Applications
- Kubernetes for Container Orchestration
- Deployment on Cloud Platforms (AWS, GCP, Azure)

## 10. Soft Skills and Career Guidance

- Effective Communication as a Full Stack Developer
- Agile Development Methodologies (Scrum, Kanban)
- Code Reviews and Best Practices
- Resume Building and Interview Preparation