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Java Full Stack Roadmap & Syllabus

The most in-demand enterprise stack in India. Build backend services with Java and Spring Boot, store data in SQL databases and build the UI with Angular or React.

Java 17+ | Spring Boot | Spring Data JPA | MySQL / PostgreSQL | Microservices | Angular / React | Git

FRESHERS & STUDENTS	EXPERIENCED (JOB SWITCHERS)	WORKING PROFESSIONALS
6–7 months	**3–4 months**	**3–6 months (alongside work)**

Durations are approximate and assume about 2–3 hours of focused study a day. Move faster or slower as you need — understanding matters more than speed.

Contents: 1. Freshers & Students · 2. Experienced (Job Switchers) · 3. Working Professionals · 4. Complete Syllabus

Freshers & Students

Starting from the basics and preparing for a first developer job.

Approximate duration: 6–7 months — From programming basics to a deployable full stack project and interview readiness.

1 Core Java & OOP — 5–6 weeks

- Syntax, control flow, arrays, strings
- Classes, objects and the four OOP pillars
- Exception handling
- Practise 40–50 basic coding problems

Milestone: Write small console programs and explain OOP with your own examples.

2 Collections & Modern Java — 4 weeks

- List, Set, Map and when to use each
- HashMap internals at a basic level
- Lambdas and the Stream API
- Optional

Milestone: Solve problems using collections and streams instead of plain loops.

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3

SQL & Databases

3 weeks

- Tables, keys and normalization
- Joins, GROUP BY, HAVING, subqueries
- Common interview queries (Nth highest salary, duplicates)

Milestone: Design a small schema and write queries for real business questions.

4

Spring Boot & REST APIs

6 weeks

- Dependency injection and project structure
- REST controllers, DTOs and validation
- Spring Data JPA with MySQL
- Exception handling, basic JWT security, unit tests

Milestone: Build and test a CRUD REST API with authentication.

5

Frontend Basics

4 weeks

- HTML, CSS, JavaScript and TypeScript
- Angular or React components, routing and forms
- Calling your Spring Boot API

Milestone: Connect a working UI to your backend.

6

Project, Git & Interview Prep

4 weeks

- One complete full stack project on GitHub
- Resume and project explanation
- Mock interviews: Java, SQL, Spring Boot, coding

Milestone: Explain your project architecture confidently in an interview.

Projects to build

- Employee management system (CRUD, search, pagination)
- Library or hostel management app with roles
- E-commerce backend with cart and orders + Angular/React UI

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Experienced (Job Switchers)

1–4 years of experience, preparing to switch jobs or move to a stronger role.

Approximate duration: 3–4 months — Fill the gaps interviewers probe in 1–4 year developers and add microservices depth.

1 Java Depth — 3 weeks

- Collections internals and performance
- Java 8–21 features you should use
- Multithreading, ExecutorService, CompletableFuture
- JVM memory and garbage collection basics

Milestone: Answer "how does it work internally?" questions, not just definitions.

2 Spring Boot in Production — 4 weeks

- Bean lifecycle and scopes
- Transactions and propagation
- JPA performance: N+1, fetch types, pagination
- Spring Security with JWT, testing with Mockito and MockMvc

Milestone: Explain the trade-offs behind your Spring Boot design decisions.

3 Microservices & Messaging — 4 weeks

- Service boundaries and communication
- API gateway, discovery, config
- Resilience4j: timeouts, retries, circuit breakers
- Kafka basics and event-driven design

Milestone: Draw and defend a microservices architecture on a whiteboard.

4 Interview Readiness — 3 weeks

- Advanced SQL: window functions, indexing
- Coding rounds: strings, collections, streams
- Scenario questions from your current project
- Two or three mock interviews with feedback

Milestone: Handle follow-up questions on your real project with clear examples.

Projects to build

- Split a monolith feature into two services with a gateway
- Add caching, pagination and an audit log to an existing API
- Event-driven order processing with Kafka

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Working Professionals

Working developers upskilling toward senior, lead or architect responsibilities.

Approximate duration: 3–6 months (alongside work) — Grow from feature developer to someone who designs systems and guides a team.

1

System Design Foundations

4–6 weeks

- Scalability, caching and load balancing
- Database choices and data modelling
- Consistency, availability and trade-offs
- Designing APIs that last

Milestone: Design a well-known system (e.g. URL shortener, booking system) end to end.

2

Cloud & DevOps

4–6 weeks

- Docker and container basics
- CI/CD pipelines
- Kubernetes concepts
- Monitoring, logging and tracing

Milestone: Take a service from commit to production with an automated pipeline.

3

Quality & Performance

3–4 weeks

- Profiling and performance tuning
- Security best practices (OWASP)
- Code review and clean architecture
- Test strategy for a team

Milestone: Find and fix a real performance or security issue in a codebase.

4

Leadership & AI-assisted Development

Ongoing

- Mentoring and technical documentation
- Estimation and breaking down work
- Using AI coding assistants responsibly
- Integrating LLM features with Spring AI

Milestone: Lead the design of a feature and mentor others through it.

Projects to build

- Design document for a scalable feature in your domain
- Containerised microservice with a CI/CD pipeline
- Add an AI-powered feature (search or summarisation) to a Spring Boot app

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Complete Java Full Stack Syllabus

Everything this track covers, grouped by topic. Use it as a checklist.

01 Core Java

- JVM, JDK and JRE
- Data types, operators, control flow
- Strings and immutability
- Arrays
- Exception handling
- Packages and access modifiers

02 Object-Oriented Programming

- Classes, objects, constructors
- Inheritance and polymorphism
- Abstraction and interfaces
- Encapsulation
- equals(), hashCode() and toString()
- SOLID principles

03 Collections & Generics

- List, Set, Map, Queue
- ArrayList vs LinkedList
- HashMap internals
- Comparable vs Comparator
- Generics and wildcards
- Fail-fast vs fail-safe iterators

04 Modern Java (8–21)

- Lambdas and functional interfaces
- Stream API
- Optional
- Date and Time API
- Records, sealed classes, switch expressions
- Virtual threads (overview)

05 Multithreading & Concurrency

- Thread lifecycle
- synchronized and volatile
- ExecutorService and thread pools
- CompletableFuture
- Concurrent collections
- Deadlocks and race conditions

06 SQL & JDBC

- Tables, keys and normalization
- Joins, GROUP BY, HAVING
- Subqueries and window functions
- Indexes and query performance
- Transactions and isolation levels
- JDBC basics

07 Spring Boot

- Dependency injection and beans
- Auto-configuration and starters
- REST controllers and DTOs
- Validation and global exception handling
- Spring Data JPA and Hibernate
- Profiles and configuration

08 Security & Testing

- Spring Security basics
- JWT authentication
- Password hashing
- JUnit 5 and Mockito
- Integration tests with MockMvc
- Logging

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09 Microservices

- Monolith vs microservices
- Service communication (REST, messaging)
- API gateway and service discovery
- Resilience (Resilience4j)
- Kafka or RabbitMQ basics
- Distributed tracing

11 Tools & Deployment

- Git and GitHub workflow
- Maven or Gradle
- Postman
- Docker basics
- CI/CD concepts
- Cloud deployment basics

10 Frontend (Angular or React)

- HTML, CSS, JavaScript and TypeScript
- Components and routing
- Forms and validation
- Calling Spring Boot APIs
- State management basics
- Deploying the frontend

Roles this track prepares you for

Java Developer | Java Full Stack Developer | Spring Boot Developer | Backend Engineer

Want a personal plan or interview preparation?

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Roadmaps are for learning guidance and do not guarantee jobs or placements.

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