Back-End Development
(Node.js / Django / Spring Boot)

Chapter 1: Introduction to Back-End Development

- What is back-end development
- Client–server architecture
- Role of APIs & databases
- Backend vs frontend responsibilities
- Career paths & opportunities

Chapter 2: Programming Fundamentals

- Backend programming basics
- Data types & variables
- Control flow statements
- Functions & methods
- Writing clean, readable code

Chapter 3: Backend Language Foundations

- JavaScript for backend (Node.js)
- Python basics for Django
- Java fundamentals for Spring Boot
- Syntax comparison
- Choosing the right backend stack

Chapter 4: Web Servers & HTTP Fundamentals

- How web servers work
- HTTP methods & status codes
- Request–response lifecycle
- REST principles
- API design basics

Chapter 5: Database Fundamentals

- Introduction to databases

- SQL vs NoSQL
- Database schema design
- CRUD operations
- Database optimization basics

Chapter 6: Backend with Node.js & Express

- Node.js architecture
- Express framework basics
- Routing & middleware
- REST API development
- Error handling

Chapter 7: Backend with Django

- Django project structure
- Models, views & templates
- URL routing
- Django ORM
- Form handling

Chapter 8: Backend with Spring Boot

- Introduction to Spring Boot
- Project setup & configuration
- Controllers & services
- JPA & Hibernate
- REST API creation

Chapter 9: Authentication & Authorization

- User authentication concepts
- JWT & session-based auth
- Role-based access control
- Password encryption
- Securing APIs

Chapter 10: API Development & Integration

- RESTful API standards
- API versioning
- Consuming third-party APIs
- Data serialization (JSON)
- API testing with Postman

Chapter 11: Deployment & Cloud Basics

- Server & hosting concepts
- Environment configuration
- Deployment for Node, Django & Spring
- Docker basics
- CI/CD overview

Chapter 12: Testing, Debugging & Performance

- Debugging backend applications
- Unit & integration testing
- Logging & monitoring
- Performance tuning
- Memory & resource management

Chapter 13: Security & Best Practices

- Web security fundamentals
- SQL injection & XSS prevention
- Secure API design
- Environment variable management
- Production best practices

Chapter 14: Final Project & Industry Practices

- End-to-end backend project
- Database & API integration
- Version control with Git
- Code review practices
- Project deployment & presentation