Mastering The Java & The Tech skills

Week 1: The Core Foundation & Java Environment

Focus: Syntax, Logic.

Java Chapters:

- JVM, JRE, JDK (The "How it works" talk)
- Variables, Data Types (Primitives vs Objects), and Operators
- Control Flow: if/else, switch, and for/while loops

Mini Project: Smart Calculator

- A console app that handles basic math and logs history.

Week 2: Object-Oriented Programming (OOP)

Focus: Organizing code and managing data lists.

Java Chapters:

- Classes and Objects (Constructors, this keyword)
- The 4 Pillars: Encapsulation, Inheritance, Polymorphism, Abstraction
- Interfaces vs Abstract Classes

Mini-Project: Student Mangament System

- Create a system to add/view students using OOP principles.

Week 3: Advanced Java, Collections & Searching/Sorting

Focus: Using the Java Collections Framework (JCF) and optimizing data.

Java Chapters:

- Exception Handling (try-catch-finally, custom exceptions)
- Java Collections: ArrayList, HashMap, HashSet
- Generics and File I/O (Reading/Writing .txt files)

Mini-Project: Word Frequency Counter

- An app that reads a text file and uses a HashMap to count how many times each word appears.

Week 4: Legacy Desktop Development (Swing)

Focus: Teach the Event Dispatch Thread (EDT). Explain while long-running tasks freeze the UI

Java Chapters:

- JFrame, JPanel
- Layout Managers (BoderLayout, GridLayout)
- Event Listeners
- Graphics Class

Mini-project: "Retro Paint & Sketch"

- A simple window where users can click to draw shapes and change colors.

Week 5: Modern Desktop Development (JavaFX)

Focus: The MVC Pattern (Model-View-Controller). This is a crucial IT term. Students must explain how the Controller connects the UI to to the Logic.

Java Chapters:

- Scene Builder
- FXML
- CSS in Java
- Properties and Bindings
- ObservableList

Mini-project: "Media Player UI"

- A sleek interface with a progress bar, volume slider, and "Play/Pause" animations.

Week 6: Data Persistence (JDBC & SQL)

Focus: Security & Sanitization

- Teach the English terms SQL Injection and Encryption

Java Chapters:

- Connecting to MySQL/PostgreSQL
- Statement vs PreparedStatement
- ResultSets
- Basic CRUD operations

Mini-project: "Secure Login System"

- A desktop app that verifies credentials against a real database rather than local memory.

Week 7: The Spring Framework Foundations

Focus: Abstraction. Students should explain why "hard-coding" objects is bad for scaling

Java Chapters:

- Dependency Injection (DI)
- Inversion of Control (IoC)
- Spring Boot Starters
- Annotations (@Component, @Autowired)

Mini-project: "Dependency Injection Demo"

- A console app that switches "Engines" for a "Car" class using Spring configuration to show loose coupling.

Week 8: Building RESTful APIs (Spring Web)

Focus: Client-Server Architecture. Teach the terminology of HTTP: Status Codes (200 OK, 404 Not Found), Headers, and Payloads

Java Chapters:

- @RestController
- @RequestMapping
- Path Variables
- Request Bodies
- JSON handling with Jackson

Mini-project: "Task Management API"

- A backend where a user can send a "POST" request to create a task and a "GET" request to view it.

Week 9: Spring Data JPA & Hibernate

Focus: Automation vs Control. Discuss the trade-offs of using an ORM.

Java Chapters:

- Object-Relational Mapping (ORM)
- Entity classes (@Entity)
- Repository interfaces
- Automated Query methods

Mini-project: "Online Bookstore Backend"

- A system that automatically maps Java classes to database tables and handles complex searches.

Week 10: Integration & The Final Capstone

Focus: The Technical Presentation. The student must give a 10-minute presentation in English covering their "Tech Stack", "Challenges Overcome", and "Code Logic"

Java Chapters:

- Connecting the JavaFX Frontend to the Spring Boot Backend using HttpClient.
- Unit Testing with Junit

Final Project:

- JavaFX dashboard with charts.