

Here is the complete day-wise checklist based on the curriculum provided.

WEEK 1 – Backend Foundations, DB, ORM

DAY 1 — JDBC + PostgreSQL → Basic DB Foundations

- [] **Watch:** Videos 121–130
- [] **Learn Extra:** SQL basics
- [] **Learn Extra:** Relational modeling
- [] **Implement:** Install PostgreSQL
- [] **Implement:** Create database pprdb
- [] **Implement:** Create tables users, reports manually

DAY 2 — ORM / Hibernate / JPA

- [] **Watch:** Videos 131–153
- [] **Learn Extra:** Real entity modeling
- [] **Learn Extra:** DTOs vs Entities
- [] **Implement:** Set up basic Spring Boot project
- [] **Implement:** Create User entity
- [] **Implement:** Create Reports entity
- [] **Implement:** Define Location as an embedded object

DAY 3 — Spring Boot Layers

- [] **Watch:** Videos 154–189
- [] **Learn Extra:** Controller → Service → Repository pattern (enterprise style)
- [] **Implement:** Create user-service skeleton
- [] **Implement:** Register user functionality
- [] **Implement:** Get user functionality

DAY 4 — JPA, Relations, DB Design

- [] **Watch:** Videos 244–253
- [] **Learn Extra:** Domain-driven design concepts (aggregates, bounded context)
- [] **Implement:** Define relation: Report belongs to a User
- [] **Implement:** Define relation: User → many Reports

DAY 5 — REST Endpoints

- [] **Watch:** Videos 233–243
- [] **Learn Extra:** HTTP status code conventions
- [] **Learn Extra:** REST standard naming conventions
- [] **Implement:** Endpoint POST /reports

- [] **Implement:** Endpoint GET /reports

DAY 6 – Upload Images

- [] **Watch:** Videos 263, 264
- [] **Learn Extra:** Strategies for storing attachments
- [] **Learn Extra:** Serving static content
- [] **Learn Extra:** Media management patterns
- [] **Implement:** Functionality to upload an image along with a report

DAY 7 – Consolidation

- [] **Implement:** Document APIs in Postman
- [] **Implement:** Set up Swagger OpenAPI

WEEK 2 – Security + Role-Based Auth (Industry Grade)

DAY 8–10 — Spring Security

- [] **Watch:** Videos 288–314
- [] **Learn Extra:** Roles & permissions concepts
- [] **Learn Extra:** Securing resources generally
- [] **Implement Role:** citizens
- [] **Implement Role:** municipal
- [] **Implement Role:** ngo
- [] **Implement Authentication Endpoint:** /auth/login

DAY 11–13 — JWT + Token Based

- [] **Watch:** Videos 321–330
- [] **Learn Extra:** JWT claims structure
- [] **Learn Extra:** Refresh tokens concepts
- [] **Learn Extra:** Token expiration strategies
- [] **Implement:** Generate JWT successfully on login
- [] **Implement:** Protect all application routes using JWT

DAY 14 — Security Testing

- [] **Implement:** Secure all reports APIs
- [] **Implement:** Secure attachment handling
- [] **Implement:** Secure image uploads

WEEK 3 – Microservices Architecture (Production Level)

Microservices Series Overview

- [] **Watch:** Videos 426–447 (Spread throughout the week as needed)

DAY 15 — Service Separation

- [] **Implement:** Separate user-service into its own microservice
- [] **Implement:** Separate report-service into its own microservice
- [] **Implement:** Create skeleton map-service
- [] **Implement:** Create skeleton ai-service

DAY 16 — Service Discovery / Eureka

- [] **Learn Extra:** Service registry concepts
- [] **Learn Extra:** Service health monitoring
- [] **Learn Extra:** Load balancing basics in microservices
- [] **Implement:** Set up Eureka Server and connect services

DAY 17 — Feign Client

- [] **Implement:** Feign client for report-service to look up data from user-service
- [] **Implement:** Feign client for ai-service to communicate with report-service

DAY 18 — API Gateway

- [] **Learn Extra:** Gateway routing concepts
- [] **Learn Extra:** Distributed authentication patterns
- [] **Implement:** Set up API Gateway

DAY 19 — Config Server

- [] **Implement:** Set up Config Server
- [] **Implement:** Configure configurations per service
- [] **Implement:** Basic secrets management

DAY 20 — Inter-service contracts

- [] **Ensure:** DTO consistency between services
- [] **Establish:** Service versioning strategy

DAY 21 — Testing

- [] **Perform:** Manual API testing across the microservices

WEEK 4 – PostGIS + MAPS

DAY 22 — Learn PostGIS

- [] **Learn Topic:** Geometry data types
- [] **Learn Topic:** SRID (Spatial Reference System Identifier)
- [] **Learn Topic:** Spatial indexes

DAY 23 — Spatial Queries

- [] **Implement:** Query for "reports near me"
- [] **Implement:** Bounding box queries
- [] **Implement:** Usage of ST_DWithin

DAY 24 — Mapbox / Leaflet

- [] **Learn:** Map tiles concepts
- [] **Learn:** Implementing markers
- [] **Learn:** Implementing popups

DAY 25 — Flutter Maps

- [] **Learn:** Integrating the Flutter map plugin
- [] **Learn:** Handling coordinates in Flutter
- [] **Learn:** Handling map gestures

DAY 26 — Show Reports on Map

- [] **Implement:** Flutter app fetches reports from backend
- [] **Implement:** Flutter app plots markers on the map based on fetched reports

DAY 27 — Filters on Map

- [] **Implement:** Filter reports on map by price (if applicable)
- [] **Implement:** Filter reports on map by status
- [] **Implement:** Filter reports on map by category
- [] **Implement:** Filter reports on map by distance

DAY 28 – Clustering markers

- [] **Implement:** Marker clustering on the map for dense areas

WEEK 5 – AI SERVICE (Professional)

DAY 29–30 — FastAPI Basics

- [] **Learn:** Async endpoints in Python/FastAPI
- [] **Learn:** Pydantic models

DAY 31–32 — NLP Classification

- [] **Learn Topic:** Keyword-based classification
- [] **Learn Topic:** Regex-based classification
- [] **Learn Topic:** Category prediction concepts

DAY 33 – Image Classification (initial)

- [] **Learn:** Basic computer vision concepts
- [] **Learn:** Model deployment ideas
- [] **Implement:** Create a stub for image classification (placeholder)

DAY 34 – Combined AI endpoint

- [] **Implement:** Create endpoint /classify-report
- [] **Ensure:** Endpoint returns category, probability, and recommended department

DAY 35 – AI integration to report-service

- [] **Implement:** Integrate AI service into report-service to auto-categorize report text upon submission

DAY 36 — AI versioning

- [] **Plan/Implement:** Strategy for model updates
 - [] **Plan/Implement:** Strategy for backward compatibility
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WEEK 6 – Heatmaps + Analytics

DAY 37 — Geospatial Aggregation

- [] **Learn/Implement:** ST_SnapToGrid for geospatial aggregation
- [] **Implement:** Bucketing reports geographically

DAY 38 — Heatmap API

- [] **Implement:** API endpoint delivering heatmap data in JSON format (lat, lng, intensity)

DAY 39–40 — Flutter Heatmap

- [] **Learn:** Overlay rendering in Flutter
- [] **Implement:** Render heatmap overlay on the Flutter map

DAY 41 — Time-series analytics

- [] **Implement Analytics:** Reports per day
- [] **Implement Analytics:** Reports per category
- [] **Implement Analytics:** Moving window analysis

DAY 42 — Stakeholder dashboard

- [] **Implement View:** Municipal dashboard
 - [] **Implement View:** Citizen view dashboard
 - [] **Implement View:** NGO view dashboard
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WEEK 7 – Hotspot Prediction (AI/ML)

DAY 43–44 ML fundamentals

- [] **Learn Topic:** Supervised learning basics
- [] **Learn Topic:** Classification basics
- [] **Learn Topic:** Regression basics

DAY 45–46 Data Engineering

- [] **Implement:** Extract feature: location

- [] **Implement:** Extract feature: category

- [] **Implement:** Extract feature: time

DAY 47 train model (scikit-learn)

- [] **Implement:** Train a logistic regression baseline model using scikit-learn

DAY 48 prediction endpoint

- [] **Implement:** Create endpoint /predict-hotspots serving the trained model

DAY 49 prediction heatmap

- [] **Implement:** Visualize predicted hotspots as a heatmap
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WEEK 8 – DevOps + Deployment

DAY 50–51 Docker

- [] **Watch:** Videos 334–350

DAY 52 — Docker Compose

- [] **Implement:** Define service: postgres + postgis
- [] **Implement:** Define service: user-service
- [] **Implement:** Define service: report-service
- [] **Implement:** Define service: ai-service
- [] **Implement:** Create final docker-compose.yml linking them

DAY 53 Cloud

- [] **Learn Extra:** Oracle Cloud basics
- [] **Learn Extra:** VM setup procedure
- [] **Learn Extra:** Reverse proxy concepts (e.g., Nginx)
- [] **Learn Extra:** SSL certificate setup (e.g., Let's Encrypt)

DAY 54 Monitoring/logging

- [] **Implement:** Integrate Micrometer for metrics
- [] **Implement (Optional):** Setup Prometheus
- [] **Implement (Optional):** Setup Grafana dashboards

DAY 55 Security Hardening

- [] **Learn/Apply:** OWASP Top 10 principles
- [] **Implement:** Robust input validation
- [] **Implement:** Rate limiting on APIs
- [] **Implement:** XSS (Cross-Site Scripting) prevention measures
- [] **Implement:** CSRF (Cross-Site Request Forgery) protection measures

