

Backend Development with Java

“Databases, SQL, JDBC, Virtualization, Docker”

Detailed Course Syllabus

Instructor:	© Elvin Taghizade
Duration:	1 months
Lesson time:	3 times a week, 2 hours each lesson

A. Third Part - Introduction to Databases

1. Introduction / Software Setup / Database fundamentals
 - a. Install PostgreSQL
 - b. Install DataGrip/DBeaver
 - c. Database created and connection
 - d. Relational and non-relational databases
 - e. Structured Query Language - SQL syntax
 - f. DML, DDL, TCL, DCL overview
 - g. SQL data types
 - h. DDL intro and basic commands
 - CREATE DATABASE / SCHEMA / TABLE + TRUNCATE
 - DROP DATABASE / SCHEMA / TABLE
 - ALTER DATABASE / SCHEMA / TABLE
 - SELECT / SELECT DISTINCT / INSERT INTO
 - i. All lessons at [w3school](https://www.w3schools.com/sql/) (additional [Postgres doc](#) & [Postgres tutorial](#))
2. SQL Fundamentals, DML for basic CRUD operations
 - a. Filtering and Sorting data
 - SELECT / SELECT DISTINCT / LIMIT / ORDER BY / CASE
 - WHERE clause / AND / OR / NOT / NULL operators
 - UPDATE-SET / DELETE operators
 - Aliases, Wildcards, AS / LIKE / IN / BETWEEN
 - b. Aggregate Functions
 - MIN(), MAX(), SUM(), COUNT(), AVG()
 - c. Quiz & Practice
3. SQL Constraints
 - a. NOT NULL / UNIQUE / AUTO INCREMENT / PRIMARY KEY
 - b. CHECK / DEFAULT / INDEX / FOREIGN KEY
 - c. Relational database modeling
 - d. Entity Relationship Diagrams (ERDs)
 - e. Quiz & Practice
4. Relationships
 - a. One-to-one
 - b. One-to-many & many-to-one
 - c. Many-to-many
 - d. Joins
 - INNER / LEFT / RIGHT / FULL OUTER
 - e. Cartesian Products
 - f. UNION / GROUP BY / HAVING / EXISTS / ANY-ALL
 - g. Booking app database structure development

5. JDBC
 - a. Introduction to JDBC API
 - b. Drivers
 - c. Connection
 - d. Statements
 - Create Statements
 - Prepared Statements
 - Callable Statements
 - e. ResultSets
 - f. JDBC transactions, auto-commit
 - g. Quiz & Practice
6. Virtualization, VMs, Containerization, Docker
 - a. Create postgres docker containers and connect to it from java app
 - b. Basic docker commands, docker under the hood, docker hub
 - c. Network modes for docker apps
 - d. Quiz & Practice
7. Practice: Booking Application with Postgres db
8. Module 03 Final Exam