SCANDINAVIAN ACADEMY

For Training and Development

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Course: PostgreSQL: A Comprehensive Guide to Database Management

Code	City	Hotel	Start	End	Price	Language - Hours
IT-932	Tbilisi (Georgia)	Hotel Meeting Room	2027-02-22	2027-02-26	4950 €	En - 25

Course Introduction:

Welcome to this comprehensive course on PostgreSQL, one of the most powerful and widely used open-source relational database management systems (RDBMS). This course is designed to take you from a complete beginner to a confident user, capable of designing, managing, and optimizing databases for a wide range of applications. Whether you are a developer looking to build robust applications, a data analyst needing to store and query large datasets, or a student eager to master a fundamental skill, this course provides the practical knowledge you need to succeed. We will cover everything from basic SQL queries to advanced database administration tasks, all through hands-on exercises and real-world examples.

Course Objectives

Upon completion of this course, you will be able to:

- Understand Relational Database Concepts: Grasp the core principles of relational databases, including tables, columns, rows, and relationships.
- Master SQL Fundamentals: Write and execute basic to intermediate SQL queries for data retrieval, insertion, updating, and deletion.
- Design and Structure Databases: Learn how to create well-structured database schemas using data types, constraints, and keys.
- Perform Data Management Tasks: Effectively manage data using transactions, backups, and restores.
- Optimize Database Performance: Understand and apply techniques for improving

query performance using indexes, views, and execution plans.
- Work with Advanced Features: Utilize advanced PostgreSQL features such as JSONB, window functions, and Common Table Expressions (CTEs).
- Connect to Applications: Integrate PostgreSQL with programming languages like Python or Node.js to build dynamic, data-driven applications.

Course Outline & Key Topics

Module 1: Getting Started with PostgreSQL

- Introduction to relational databases and PostgreSQL.
- Installation and setup of PostgreSQL and pgAdmin.
- Basic command-line tools

Module 2: SQL Fundamentals

- SELECT statement for data retrieval.
- Filtering data with the **WHERE** clause.
- Sorting results with **ORDER BY**.
- Using aggregate functions like **COUNT**, **SUM**, and **AVG**.
- Grouping data with **GROUP BY** and filtering groups with **HAVING**.

Module 3: Data Definition and Manipulation

- Data types in PostgreSQL (e.g., INT, TEXT, DATE, NUMERIC).
- Creating, altering, and dropping tables.
- **INSERT**, **UPDATE**, and **DELETE** statements.
- Understanding constraints (**PRIMARY KEY**, **FOREIGN KEY**, **NOT NULL**, **UNIQUE**).

Module 4: Joins and Relationships

- Understanding different types of joins: **INNER JOIN**, **LEFT JOIN**, **RIGHT JOIN**, **FULL OUTER JOIN**.
- Joining multiple tables.

- Using aliases for tables and columns.

Module 5: Advanced SQL Techniques

- Subqueries.
- Common Table Expressions (**CTEs**).
- Window functions for advanced analytics.
- Working with dates and timestamps.
- String manipulation functions.

Module 6: Database Design & Normalization

- Principles of database design.
- Normalization (1NF, 2NF, 3NF).
- Designing a sample database schema.

Module 7: Database Administration and Performance

- Understanding and creating indexes.
- Analyzing query performance with EXPLAIN.
- Managing users and permissions.
- Backup and restore strategies.

Module 8: Advanced PostgreSQL Features & Application Integration

- Using JSONB data type for flexible schemas.
- Creating views and materialized views.
- Introduction to stored procedures and functions.
- Connecting PostgreSQL to a programming language

The Scandinavian Academy for Training and Development adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training and Development.

Program Timings:

- 9:00 AM to 2:00 PM in Arab cities.
- 10:00 AM to 3:00 PM in European and Asian cities.

The program includes:

- A daily Coffee Break provided during the sessions to ensure participants comfort.