Course Name : **PRACTICAL POSTGRESQL: QUERY MASTERY**
Duration : **3 Days (Physical Classroom / Virtual Live Instructor)**
Skill Level : **Beginner**

COURSE DESCRIPTION:
Embark on a transformative journey with our "Mastering PostgreSQL in 3 Days" course, designed to provide a comprehensive understanding of PostgreSQL, a leading relational database management system. The first day lays the groundwork, covering essential topics such as database terminology, table creation, and data manipulation using SELECT statements. Participants will then advance to more intricate SQL techniques, exploring database design principles, and relationships, and mastering the art of joins and aggregations on Day 2. The course culminates in Day 3, where participants delve into advanced SQL concepts, including subqueries, distinct values, and a thorough examination of PostgreSQL's data types. Practical sessions on database design, performance optimization, and index usage ensure participants are equipped with the skills needed to navigate the intricacies of PostgreSQL effectively.

By the course's conclusion, participants will possess not only a robust understanding of PostgreSQL's core functionalities but also the expertise to design efficient databases, optimize performance, and execute advanced SQL queries. This comprehensive program empowers participants to become adept PostgreSQL practitioners, ready to tackle real-world database challenges with confidence.

WHAT WILL YOU LEARN?
Throughout the "Mastering PostgreSQL in 3 Days" course, participants will acquire a profound understanding of PostgreSQL's core functionalities and advanced SQL techniques. The curriculum covers fundamental concepts, including database terminology, table creation, and data manipulation, progressing to more complex topics such as joins, aggregations, and foreign keys. Participants will delve into advanced SQL features like subqueries, distinct values, and PostgreSQL's diverse data types.

PREREQUISITE:
Beginners. No programming/database experience is required.

METHODOLOGY:
This program will be conducted with interactive lectures, PowerPoint presentations, discussions, and practical exercises. This course can be conducted as instructor-led (ILT) or virtual instructor-led training (VILT).

JOB SCOPE:
Upon completion of this course, candidates may pursue the following career paths:

- Database Administrator (DBA)
- SQL Developer
- Data Analyst
- Data Engineer
- Database Tester
- Software Engineer

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MODULE 1: INTRODUCTION TO POSTGRESQL

- Welcome
- Overview of PostgreSQL
- Database Terminology

MODULE 2: CREATING AND MANIPULATING TABLES

- Analyzing CREATE TABLE
- Inserting Data into a Table
- Retrieving Data with SELECT
- Create, Insert, and Select!
- Calculated Columns
- Calculating Phone Revenue
- Using Calculated Columns
- Exercise: Calculated Columns Solution
- String Operators and Functions

MODULE 3: FILTERING AND UPDATING DATA

- Filtering Rows with "WHERE"
- More on the "WHERE" Keyword
- Compound "WHERE" Clauses
- A "WHERE" Exercise Overview
- Practicing WHERE Statements
- "WHERE" With Lists
- A More Challenging 'WHERE'
- Calculations in "WHERE" Clauses
- Trying Calculations in WHERE Clauses
- Updating Rows
- Deleting Rows

MODULE 4: DATABASE DESIGN PRINCIPLES

- The Plan Moving Forward
- Approaching Database Design
- Let's Design Some Schema
- One-to-Many and Many-to-One Relationships
- A 'Has One' or 'Has Many'?
- One-to-One and Many-to-Many Relationships
- Identifying One-to-One and Many-to-Many Relationships
- Primary Keys and Foreign Keys
- Understanding Foreign Keys
- Foreign Keys; How Do They Work?
- Auto-Generated ID's
- Creating Foreign Key Columns
- Foreign Key Creation Solution

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- Foreign Key Constraints Around Insertion
- Constraints Around Deletion
- Testing Deletion Constraints
- Setting Foreign Keys to Null on Delete
- What Happens On Delete?
- Adding Some Complexity

MODULE 5: JOINS AND AGGREGATIONS

- Adding Some Data
- Queries with Joins and Aggregations
- Joining Data from Different Tables
- Another Quick Join
- Exercise: Practice Joining Data
- A Joinful Solution
- Alternate Forms of Syntax
- Missing Data in Joins
- Four Kinds of Joins
- Each Join in Practice
- Does Order Matter?
- WHERE with Join
- Three Way Joins

MODULE 6: AGGREGATING AND GROUPING

- Picturing GROUP BY
- Selecting Columns After Grouping
- Aggregate Functions
- Combining GROUP BY and Aggregates
- A Gotcha with COUNT
- Visualizing More Grouping
- Grouping Solution
- Adding a Layer of Difficulty
- Grouping With a Join!
- Filtering Groups with HAVING
- HAVING In Action
- More on HAVING!

MODULE 7: SUBQUERIES AND DISTINCT VALUES

- A New Dataset
- Investigating This Dataset
- Some Group By Practice
- Group By Review
- Group By Review Solution
- Remember Joins?
- Inner Join Review

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- The Basics of Sorting
- Two Variations on Sorting
- OFFSET and LIMIT
- Handling Sets with UNION
- A Few Notes on UNION
- Commonalities with INTERSECT
- Removing Commonalities with EXCEPT
- Merging Results with UNION

MODULE 8: ADVANCED SUBQUERIES AND DATA TYPES

- What's a Subquery?
- Thinking About the Structure of Data
- What's the Data Look Like?
- Subqueries in a SELECT
- Subqueries in a FROM
- From Subqueries that Return a Value
- Subqueries in a JOIN Clause
- More Useful Subqueries with WHERE
- Data Structure with WHERE Subqueries
- The NOT IN Operator with a List
- A New WHERE Operator
- Probably Too Much About Correlated Subqueries
- More on Correlated Subqueries
- A SELECT Without a FROM?

MODULE 9: DISTINCT VALUES AND ADVANCED DATA TYPES

- SELECTING DISTINCT Values
- The Greatest and Least Values in a List
- The CASE Keyword
- PostgreSQL Installation on macOS, PGAdmin Setup on macOS, Postgres Installation on Windows
- Overview and Recap
- Data Types: Numeric, Character, Boolean
- Date and Time Handling: Times, Dates, Timestamps, and Intervals
- Validation Considerations: Applying NULL Constraints, Unique Constraints, and Checks
- Practical Application: Creating and Viewing Tables, Solving Constraints Gotchas
- Schema Design Fundamentals: Fast Rules and Multi-Column Uniqueness

MODULE 10: ADVANCED DATABASE DESIGN AND PERFORMANCE OPTIMIZATION

- Approaching Complicated Designs with SQL Tools
- Schema Design Strategies: Config-based and Plan Rebuilding
- Like System Requirements and Design Alternatives
- Polymorphic Associations: Implementation Options and Simplification
- Additional Features for Posts: Captions, Locations, and Mentions

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- Follower System Design: Tags, Tables, and Data Considerations
- Practical Database Operations: Creating, Commenting, and Liking Posts
- Handling Tags and Mentions: Hashtags, Posts, and Followers
- Efficient Data Addition and Restoration Techniques
- Performance Considerations: User ID Exercises, Posts by User, Likes Per User
- PostgreSQL Internals: Understanding Storage, Heaps, and Blocks

CONCLUSION

- QA
- Useful References and Books
- Feedback

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