# PostgreSQL Basics

## Duration: 2 Days  Course Code: GK840202  Delivery Method: Virtual Learning

## Overview:

**Learn the essentials of PostgreSQL and enhance your database management skills.**
PostgreSQL Basics provides a solid foundation in PostgreSQL, a powerful open-source relational database system. You'll learn how to install, configure, and manage PostgreSQL in a development environment. The course covers essential topics such as working with different data types, writing SQL queries, designing efficient database schemas, and optimizing query performance. Additionally, you'll explore transaction management, user and role management, and basic security policies to ensure data integrity and security.
By the end of the course, you'll have the skills to effectively manage PostgreSQL databases and perform fundamental backup and restore operations. The course combines theoretical knowledge with practical exercises, ensuring you can apply what you learn in real-world scenarios. Join us to unlock the full potential of PostgreSQL and enhance your database management skills.

Virtual Learning

This interactive training can be taken from any location, your office or home and is delivered by a trainer. This training does not have any delegates in the class with the instructor, since all delegates are virtually connected.  Virtual delegates do not travel to this course, Global Knowledge will send you all the information needed before the start of the course and you can test the logins.

## Target Audience:

- Software developers
- Data scientists
- System administrators
- Technical professionals.

## Objectives:

- Install and configure PostgreSQL in a development environment
- Select and implement fundamental data types including numeric, character, and date/time types
- Write essential SQL queries using basic joins, filtering, and aggregations
- Design normalized database schemas and implement key constraints for data integrity
- Understand and implement B-tree indexes to optimize common query patterns
- Manage basic transactions and understand isolation levels
- Execute concurrent operations safely using proper transaction management
- Create and manage users and roles with appropriate privileges using GRANT/REVOKE
- Implement basic security policies and access controls
- Perform fundamental backup and restore operations

## Prerequisites:

- Foundational knowledge of databases, operating systems, networking, and programming
- GK3150 - Understanding Networking Fundamentals
- GK840203 - Introduction to Programming

## Content:

Module 1: Introduction to PostgreSQL

- Introducing PostgreSQL

Module 2: Installation and Configuration

- Configuring PostgreSQL for optimal performance
- Using two ways to modify PostgreSQL settings
- Locating PostgreSQL configuration files
- Configuring PostgreSQL for remote connections
- Managing client access with pg_hba.conf

Module 3: Data Types and Table Basics

- Tables in PostgreSQL
- Integer data type
- Numeric or Decimal data type
- Character data type
- Date/Time data type
- Boolean data type
- Arrays
- JSON data type
- Special data types
- Using PostgreSQL for vector storage

Module 4: SQL Fundamentals

- Adding, updating, and deleting table data
- SELECT syntax
- WHERE clause and filtering with comparison operators
- Combining conditions with logical operators
- Pattern matching with LIKE and wildcards
- Range filtering in SQL
- Combining BETWEEN with other operators
- Working with NULL values and combining NULL checks with other conditions
- Combining data with JOINs

Module 5: Database Design and Management

- Entities and relationships
- Normalization task
- Trade off from denormalization
- Table relationships
- Constraint types and usage
- Subqueries for querying and data base manipulation
- Removing duplicate rows
- Cartesian product
- Schema organization

Module 6: Indexing and Performance

- Indexing fundamentals
- Optimizing index usage in PostgreSQL
- Query performance analysis
- Using EXPLAIN and EXPLAIN ANALYZE
- Identifying common query issues
- Query optimization techniques
- Auto vacuum and index maintenance

Module 7: Transaction Management

- Common errors in transaction management
- Transaction isolation levels
- Query performance analysis
- Handling concurrent access
- Deadlock prevention and resolution

Module 8: Security Implementation

- Checking current privileges
- Auditing privileges
- Principle of Least Privilege
- Schema permissions
- Object privileges
- Password policies
- Basic backup and recovery

## Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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