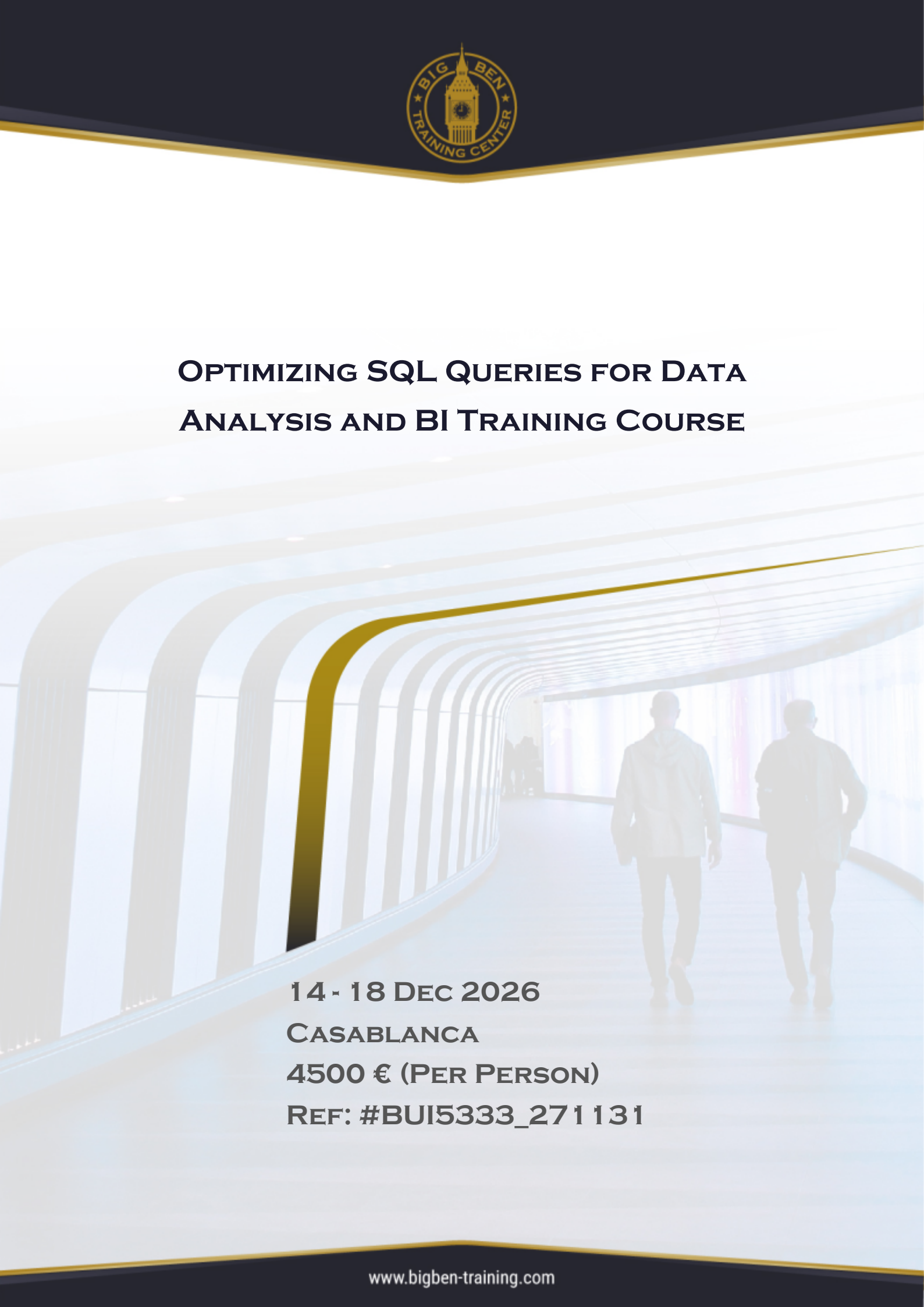
Optimizing SQL Queries for Data Analysis and BI Training Course



14 - 18 Dec 2026

Casablanca

4500 € (Per Person)

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Course Introduction / Overview:

In today's data-driven landscape, the ability to retrieve and analyze information quickly is a critical competitive advantage. However, inefficient SQL queries can create significant bottlenecks, slowing down reports, dashboards, and analytical processes, ultimately hindering timely decision-making. This intensive training course is meticulously designed to transform participants from SQL users into SQL performance experts. We delve deep into the art and science of query optimization, moving beyond basic syntax to explore the inner workings of database engines. As the renowned author Joe Celko discusses in his seminal work, "Joe Celko's SQL for Smarties", writing correct SQL is only the first step; writing efficient SQL is what separates the novice from the expert. This program, offered by BIG BEN Training Center, provides a comprehensive framework for diagnosing performance issues, rewriting problematic code, and designing database structures that support high-speed data retrieval. Participants will gain hands-on experience with execution plans, indexing strategies, and advanced SQL features, ensuring they can build and maintain robust, high-performance data solutions for business intelligence and data analysis.

Target Audience / This training course is suitable for:

- Data Analysts.
- Business Intelligence (BI) Developers and Consultants.
- Database Administrators (DBAs).
- Data Scientists.
- IT Professionals working with databases.
- Software Engineers and Backend Developers.
- Data Engineers.
- Business Analysts who write their own queries.
- Report Writers and Developers.

Target Sectors and Industries:

- Financial Services and Banking.
- Healthcare and Pharmaceuticals.
- E-commerce and Retail.
- Technology and Software Development.
- Telecommunications.
- Logistics and Supply Chain Management.
- Government and Public Sector Agencies.
- Consulting and Professional Services.

Target Organizations Departments:

- Information Technology (IT).
- Business Intelligence (BI) and Analytics.
- Data Science and Research.
- Finance and Accounting.
- Marketing and Sales Operations.
- Operations and Logistics.
- Product Development and Engineering.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze and interpret complex SQL query execution plans to identify performance bottlenecks.
- Implement advanced indexing strategies, including clustered, non-clustered, and covering indexes.
- Write highly efficient and scalable SQL queries for large and complex datasets.
- Master the use of Common Table Expressions (CTEs) and window functions for sophisticated analysis.
- Effectively troubleshoot and resolve common SQL performance issues.
- Optimize database design and table structures for enhanced query speed.
- Apply best practices for writing queries that support interactive BI dashboards and reports.
- Develop a proactive approach to database performance monitoring and tuning.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, practical, and highly interactive, ensuring that participants not only learn the theory but can also apply it effectively in their professional roles. This course moves beyond traditional lectures by incorporating a blended learning approach. A significant portion of the training is dedicated to hands-on labs and real-world coding exercises where participants work with sample databases to diagnose and fix poorly performing queries. We utilize a case-study-based approach, presenting complex business problems that require optimized SQL solutions. These sessions are facilitated by expert instructors who provide personalized feedback and guidance. Collaborative learning is encouraged through group discussions and peer-review sessions, allowing participants to learn from each other's experiences and perspectives. The curriculum is structured to build skills progressively, with each module's concepts reinforcing the previous ones. This practical, application-focused methodology ensures that participants leave the course with tangible skills and the confidence to tackle complex SQL optimization challenges in their own work environments.

Course Agenda (Course Units):

Unit One: Fundamentals of SQL Query Performance

- The critical role of query optimization in BI and data analysis.
- Understanding the SQL query processing and execution lifecycle.
- Introduction to query execution plans and how to read them.
- Key performance metrics and how to measure query execution time.
- Setting up a performance testing environment.
- Common anti-patterns in SQL that degrade performance.
- The impact of data types and NULL values on query speed.

Unit Two: Indexing Strategies for Peak Performance

- Deep dive into B-Tree indexes and their structure.
- Clustered vs. non-clustered indexes and their use cases.
- Designing effective indexing strategies for complex queries.
- Understanding index fragmentation and maintenance.
- Using covering indexes to eliminate bookmark lookups.
- Exploring specialized indexes like filtered and columnstore indexes.
- The trade-offs of indexing: write performance vs. read performance.

Unit Three: Writing High-Performance SQL Code

- Optimizing JOIN operations: INNER, OUTER, and CROSS JOINs.
- Advanced subquery tuning and the benefits of Common Table Expressions (CTEs).
- Mastering window functions for efficient analytical queries.
- Best practices for using aggregate functions and GROUP BY clauses.
- Techniques for efficient data filtering with the WHERE clause.
- Avoiding non-sargable predicates that prevent index usage.
- Managing transactions and locking to prevent performance degradation.

Unit Four: Analyzing and Troubleshooting Performance Issues

- Using database profilers and tracing tools to identify slow queries.
- Analyzing wait statistics to diagnose resource contention.
- Understanding and resolving blocking and deadlocking issues.
- Techniques for optimizing stored procedures and user-defined functions.
- The role of the database statistics and how to manage them.
- Isolating performance problems in complex application code.
- Developing a systematic approach to performance troubleshooting.

Unit Five: Advanced Optimization and BI Integration

- Database partitioning strategies for managing very large tables.
- Query optimization for BI tools and ad-hoc reporting environments.
- In-memory database features and their impact on performance.
- Understanding and leveraging query caching mechanisms.
- Hardware considerations: CPU, memory, and storage impact on SQL performance.
- Best practices for ETL and data warehouse query optimization.
- Capstone Project: Optimizing a full-scale BI reporting suite.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Beyond technical execution, how does the philosophy of 'less is more' in data retrieval fundamentally alter the strategic approach to business intelligence reporting?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by focusing intensely on the 'why' behind SQL optimization, not just the 'how'. While many courses teach syntax and basic tuning commands, we cultivate a deeper, architectural understanding of how databases process queries. Our curriculum is built around real-world, complex scenarios that mirror the challenges participants face in their daily roles, moving far beyond simplistic textbook examples. We emphasize the diagnostic process, teaching participants to think like a database engine to systematically identify and resolve bottlenecks. The hands-on labs are not just about writing code; they are about iterative refinement, performance measurement, and justifying optimization choices based on execution plan analysis. Furthermore, the course content is specifically tailored to the context of business intelligence and data analysis, addressing the unique performance demands of interactive dashboards, complex analytical queries, and large-scale reporting. This specialized focus ensures that the skills learned are directly and immediately applicable to creating faster, more efficient data-driven insights within a corporate environment.