Advanced SQL - 35 academic hours

Course Overview:

The Advanced SQL & AI Analytics course is designed for data and software professionals who want to master advanced SQL techniques and leverage AI and LLMs to enhance analytics, automation, and productivity. Participants gain hands-on experience with advanced window functions, CTEs, and views to write complex, readable, and efficient queries, while using AI tools (such as Copilot and LLMs) to translate business questions into SQL, optimize and debug queries, and troubleshoot analytical workflows. The course includes real-world case studies such as cohort analysis, segmentation, and workflow automation, bridging classical SQL with modern AI-driven analytics.

What Participants Gain?

Graduates leave the course with advanced SQL skills using window functions, CTEs, and views to build complex analytical queries, perform advanced analyses such as cohort analysis and segmentation, and automate parts of their analytics workflows. They are able to translate business questions into accurate SQL using AI tools, optimize and debug queries with AI assistance, and implement smarter, AI-augmented analytics processes in day-to-day work.

Target Audience

- Data analysts and BI professionals
- Data scientists and analytics practitioners
- Software developers and data engineers
- Product and analytics teams
- Finance and operations professionals working with data
- Professionals seeking to enhance analytics with SQL and AI

Prerequisites

- Basic to intermediate SQL knowledge (SELECT, JOIN, GROUP BY)
- Experience working with relational databases
- Basic understanding of data and analytics concepts
- General familiarity with AI tools (an advantage, not mandatory)

Workshop Syllabus

- Window Functions
  - Ranking Functions
    - Row Number
    - Rank
    - Danse Rank
    - Ntile
  - Aggregative Window Functions
  - Offset Functions
    - Lead
    - Lag
- Window Functions: Controlling the Window
  - Rows Between
- Views
- CTE: Common Table Expression

SQL Mastery & AI Analytics

- Intro to LLM
- Prompt Engineering
- Optimization & Learning Techniques:
  - One-Shot Learning
  - Few-Shot Learning
  - Zero-Shot Learning
  - Zero-Shot CoT (Chain of Thoughts)
- Translating Business Questions into SQL Queries
  - Writing Queries with AI & Copilot
  - Optimizing, Debugging and Troubleshooting Queries using AI
- Case Studies: Real Business Analysis using SQL & AI
  - Cohort Analysis
  - Segmentation
  - Data Scaffolding
  - Automation with tool like n8n