### **Course duration**

3 days

## **Course Benefits**

- Create views to reuse SELECT statements
- Learn data retrieval using SELECT statement.
- Troubleshoot typical warnings and errors.
- Change or add data.
- · Understand MySQL data validation.
- Delete data from tables.
- Generate aggregated query data using various criteria.
- Connect data from multiple table rows using various types of JOIN constructs.
- Use several different types of sub-queries.
- Extensive coverage of MySQL Functions and expressions.
- Use expressions in SQL statements for more functional and flexible retrieval.
- Learn to export and import data.

### **Available Delivery Methods**

#### **Public Class**

Public expert-led online training from the convenience of your home, office or anywhere with an internet connection. Guaranteed to run .

### **Private Class**

Private classes are delivered for groups at your offices or a location of your choice.

### **Course Outline**

- 1. An introduction to MySQL
  - 1. An introduction to relational databases
    - 1. An introduction to client/server systems
      - 1. The hardware components of a client/server system
      - 2. The software components of a client/server system
      - 3. Other client/server architectures
    - 2. An introduction to the relational database model
      - 1. How a table is organized
      - 2. How tables are related

- 3. How columns are defined
- 4. How to read a database diagram
- 3. An introduction to SQL and SQL-based systems
  - 1. A brief history of SQL
  - 2. A comparison of Oracle, DB2, Microsoft SQL Server, and MySQL
- 4. The SQL statements
  - 1. An introduction to the SQL statements
  - 2. How to work with database objects
  - 3. How to query a single table
  - 4. How to join data from two or more tables
  - 5. How to add, update, and delete data in a table
  - 6. SQL coding guidelines
- 5. How to use SQL from an application program
  - 1. Common options for accessing MySQL data
  - 2. PHP code that retrieves data from MySQL
  - 3. Java code that retrieves data from MySQL
- 2. How to use MySQL Workbench and other development tools
  - 1. An introduction to MySQL Workbench
    - 1. The Home page of MySQL Workbench
    - 2. How to open a database connection
    - 3. How to start and stop the database server
    - 4. How to navigate through the database objects
    - 5. How to view and edit the data for a table
    - 6. How to view and edit the column definitions for a table
  - 2. How to use MySQL Workbench to run SQL statements
    - 1. How to enter and execute a SQL statement
    - 2. How to use snippets
    - 3. How to handle syntax errors
    - 4. How to open and save SQL scripts
    - 5. How to enter and execute SQL scripts
  - 3. How to use the MySQL Reference Manual
    - 1. How to view the manual
    - 2. How to look up information
  - 4. How to use the MySQL Command Line Client
    - 1. How to start and stop the MySQL Command Line Client
    - 2. How to use the MySQL Command Line Client to work with a database
- 3. How to retrieve data from a single table
  - 1. An introduction to the SELECT statement
    - 1. The basic syntax of the SELECT statement
    - 2. SELECT statement examples
  - 2. How to code the SELECT clause
    - 1. How to code column specifications
    - 2. How to name the columns in a result set using aliases
    - 3. How to code arithmetic expressions
    - 4. How to use the CONCAT function to join strings
    - 5. How to use functions with strings, dates, and numbers

- How to test expressions by coding statements without FROM clauses
- 7. How to eliminate duplicate rows
- 3. How to code the WHERE clause
  - 1. How to use the comparison operators
  - 2. How to use the AND, OR, and NOT logical operators
  - 3. How to use the IN operator
  - 4. How to use the BETWEEN operator
  - 5. How to use the LIKE and REGEXP operators
  - 6. How to use the IS NULL clause
- 4. How to code the ORDER BY clause
  - 1. How to sort by a column name
  - 2. How to sort by an alias, expression, or column number
- 5. How to code the LIMIT clause
  - 1. How to limit the number of rows
  - 2. How to return a range of rows
- 4. How to retrieve data from two or more tables
  - 1. How to work with inner joins
    - 1. How to code an inner join
    - 2. How to use table aliases
    - 3. How to join to a table in another database
    - 4. How to use compound join conditions
    - 5. How to use a self-join
    - 6. How to join more than two tables
    - 7. How to use the implicit inner join syntax
  - 2. How to work with outer joins
    - 1. How to code an outer join
    - 2. Outer join examples
  - 3. Other skills for working with joins
    - 1. How to join tables with the USING keyword
    - 2. How to join tables with the NATURAL keyword
    - 3. How to use cross joins
  - 4. How to work with unions
    - 1. How to code a union
    - 2. A union that combines result sets from different tables
    - 3. A union that combines result sets from the same tables
    - 4. A union that simulates a full outer join
- 5. How to insert, update, and delete data
  - 1. How to create test tables
    - 1. How to create the tables for this book
    - 2. How to create a copy of a table
  - 2. How to insert new rows
    - 1. How to insert a single row
    - 2. How to insert multiple rows
    - 3. How to insert default values and null values
    - 4. How to use a subquery in an INSERT statement
  - 3. How to update existing rows

- 1. How to update rows
- 2. How to use a subquery in an UPDATE statement
- 4. How to delete existing rows
  - 1. How to delete rows
  - 2. How to use a subquery in a DELETE statement
- 2. More SQL skills as you need them
  - 1. How to code summary queries
    - 1. How to work with aggregate functions
      - 1. How to code aggregate functions
      - 2. Queries that use aggregate functions
    - 2. How to group and summarize data
      - 1. How to code the GROUP BY and HAVING clauses
      - 2. Queries that use the GROUP BY and HAVING clauses
      - 3. How the HAVING clause compares to the WHERE clause
      - 4. How to code compound search conditions
      - 5. How to use the WITH ROLLUP operator
      - 6. How to use the GROUPING function
    - 3. How to code aggregate window functions
      - 1. How the aggregate window functions work
      - 2. How to use frames
      - 3. How to use named windows
  - 2. How to code subqueries
    - 1. An introduction to subqueries
      - 1. Where to code subqueries
      - 2. When to use subqueries
    - 2. How to code subqueries in the WHERE clause
      - 1. How to use the IN operator
      - 2. How to use the comparison operators
    - 3. How to use the ALL keyword
      - 1. How to use the ANY and SOME keywords
      - 2. How to cde correlated subqueries
      - 3. How to use the EXISTS operator
    - 4. How to code subqueries in other clauses
      - 1. How to code subqueries in the HAVING clause
      - 2. How to code subqueries in the SELECT clause
      - 3. How to code subqueries in the FROM clause
    - 5. How to work with complex gueries
      - 1. A complex query that uses subqueries
      - 2. A procedure for building complex queries
    - 6. How to work with common table expressions
      - 1. How to code a CTE
      - 2. How to code a recursive CTE
  - 3. How to work with data types
    - 1. The data types
      - 1. Overview
      - 2. The character types
      - 3. The integer types

- 4. The fixed-point and floating-point types
- 5. The date and time types
- 6. The ENUM and SET types
- 7. The large object types
- 2. How to convert data
  - 1. How implicit data conversion works
  - 2. How to convert data using the CAST and CONVERT functions
  - 3. How to convert data using the FORMAT and CHAR functions
- 4. How to use functions
  - 1. How to work with string data
    - 1. A summary of the string functions
    - 2. Examples that use string functions
    - 3. How to sort by a string column that contains numbers
    - 4. How to parse a string
  - 2. How to work with numeric data
    - 1. How to use the numeric functions
    - 2. How to search for floating-point numbers
  - 3. How to work with date/time data
    - 1. How to get the current date and time
    - 2. How to parse dates and times with date/time functions
    - 3. How to parse dates and times with the EXTRACT function
    - 4. How to format dates and times
    - 5. How to perform calculations on dates and times
    - 6. How to search for a date
    - 7. How to search for a time
  - 4. Other functions you should know about
    - 1. How to use the CASE function
    - 2. How to use the IF, IFNULL, and COALESCE functions
    - 3. How to use the regular expression functions
    - 4. How to use the ranking functions
    - 5. How to use the analytic functions
- 3. Stored program development
  - 1. Language skills for writing stored programs
    - 1. An introduction to stored programs
      - 1. Four types of stored programs
      - 2. A script that creates and calls a stored procedure
      - 3. A summary of statements for coding stored programs
    - 2. How to write procedural code
      - 1. How to display data
      - 2. How to declare and set variables
      - 3. How to code IF statements
      - 4. How to code CASE statements
      - 5. How to code loops
      - 6. How to use a cursor
      - 7. How to declare a condition handler
      - 8. How to use a condition handler
      - 9. How to use multiple condition handlers

- 2. How to use transactions and locking
  - 1. How to work with transactions
    - 1. How to commit and rollback transactions
    - 2. How to work with save points
  - 2. How to work with concurrency and locking
    - 1. How concurrency and locking are related
    - 2. The four concurrency problems that locks can prevent
    - 3. How to set the transaction isolation level
    - 4. How to lock selected rows
    - 5. How to prevent deadlocks
- 3. How to create stored procedures and functions
  - 1. How to code stored procedures
    - 1. How to create and call a stored procedure
    - 2. How to code input and output parameters
    - 3. How to set a default value for a parameter
    - 4. How to validate parameters and raise errors
    - 5. A stored procedure that inserts a row
    - 6. How to work with user variables
    - 7. How to work with dynamic SQL
    - 8. How to drop a stored procedure
  - 2. How to code stored functions
    - 1. How to create and call a function
    - 2. How to use function characteristics
    - 3. A function that calculates balance due
    - 4. How to drop a function
  - 3. How to use Workbench with procedures and functions
    - 1. How to view and edit stored routines
    - 2. How to create stored routines
    - 3. How to drop stored routines
- 4. How to create triggers and events
  - 1. How to work with triggers
    - 1. How to create a BEFORE trigger
    - 2. How to use a trigger to enforce data consistency
    - 3. How to create an AFTER trigger
    - 4. How to view or drop triggers
  - 2. How to work with events
    - 1. How to turn the event scheduler on or off
    - 2. How to create an event
    - 3. How to view, alter, or drop events

#### Class Materials

Each student will receive a comprehensive set of materials, including course notes and all the class examples.

# **Class Prerequisites**

Experience in the following is required for this MySQL class:

• Some knowledge of database concepts.

Experience in the following would be useful for this MySQL class:

• Some knowledge of database modeling.

Follow-on Courses

• MySQL Administration Training