



## Course Content

### Course Description:

MySQL® is the open source community's most popular Relational Database Management System (RDBMS) offering, and is a key part of LAMP – Linux™, Apache™, MySQL®, PHP/Perl/Python®. Many Fortune 500 companies adopt MySQL to reap the benefits of an open source, platform-independent RDMS, such as simplifying conversion from other platforms and lowering database Total Cost of Ownership by 90%. This class encourages the student to explore database fundamentals, as well as MySQL features. Students learn the basics of MySQL use and the programming of stored routines and triggers. Students also participate in database design discussions, and learn about optimization. Also included is an exploration of various APIs. This course covers MySQL 5.5

### Prerequisites:

Prior experience programming in any language, such as HTML, is recommended but not required.

### Audience:

Application and Web Developers, or System Administrators

### Topics:

#### Course Introduction

- Course Objectives
- Course Overview
- Using the Workbook
- Suggested References

#### Introduction to Database Concepts and MySQL

- Features of a Relational Database
- Where does SQL Fit in?
- Database Access
- Why MySQL?
- The History of MySQL
- MySQL Software Features

#### Database Design

- Developing the Design of a Database
- Database Entities
- The Primary Key
- Foreign Key Relationships
- Data Models and Normalization
- Second Normal Form (2NF)

- Third Normal Form (3NF) and Beyond
- Translating a Data Model into a Database Design

#### MySQL Client Software and the MySQL Command-Line Tool

- Available Client Software
- Environment Variable
- Running the MySQL Client
- Customizing the MySQL Prompt
- MySQL Commands
- Using the Help Command
- Some Useful MySQL Options
- Working with a Database
- Examining Table Definitions
- Other SHOW Options

#### DDL – Data Definition Language

- DDL & DML Overview
- Building Table Definitions
- Identifiers
- Column Definitions



- Numeric Datatypes
- ENUM and SET Types
- Date and Time Datatypes
- AUTO\_INCREMENT
- UNIQUE Constraints
- Primary Keys
- Modifying Tables
- Foreign Keys
- Renaming and Dropping Tables

## DML – Data Manipulation Language

- DDL & DML Overview
- Data Values: Numbers
- Data Values: Strings
- Working with NULL Values
- Bulk Loading of Data
- Bulk Data Format
- MySQL® Development
- MySQL® Development Rev 2.1.2
- Working with Special Values in Bulk
- Data
- Adding New Table Rows with INSERT
- Copying Rows
- UPDATE
- REPLACE
- Removing Table Rows
- Transactions
- InnoDB: Using Transactional Processing
- Locking Tables

## Queries – The SELECT Statement

- SELECT Syntax Summary
- Choosing Data Sources and Destinations
- for SELECT
- Presentation of Table Data with
- SELECT
- Being Selective about Which Rows are
- Displayed
- User-Defined Variables
- Expressions and Functions
- Control Flow Operators and Functions
- Function Names
- Comparison Operators and Functions
- String Functions

- Numeric Operators and Functions
- Date and Time Functions
- Forcing Data Interpretation
- Miscellaneous Functions

## Building a Result Set from Several Sources

- UNION
- Combining Data from Two Tables
- Using WHERE to Choose Matching
- Rows
- INNER JOIN
- OUTER JOINs
- Multiple Tables, Fields, Joins, and
- Ordering
- SELECT \* and USING Columns

## Advanced SQL Techniques

- MySQL Pattern Matching
- Multipliers, Anchors, and Grouping
- GROUP BY
- Aggregates
- Subqueries
- Subquery Comparisons and Quantifiers
- Other Subqueries
- Subquery Alternatives and Restrictions
- InnoDB Multi-Table Updates and
- Deletes
- Building a VIEW
- Updatable VIEWs

## MySQL Storage Engines

- Storage Engine Overview
- Other Storage Engine Types
- The Basics of Commonly Used Storage
- Engines
- MyISAM Limits and Features
- MyISAM Data File Format
- InnoDB Data Management
- MEMORY and FEDERATED
- MERGE and ARCHIVE



## Utilities

- Client Overview
- Specifying Options for Command-Line
- Clients
- Client Option Files
- Checking Tables with myisamchk and MySQLchk
- Using myisamchk and MySQLchk for Repairs
- MySQLshow and MySQLimport
- Using MySQLdump
- The MySQL Workbench – General
- MySQL Workbench - Execution
- Data Modeling with the Workbench
- SQL Development
- Third Party Tools

## Database Programmability

- Stored Routines: Basic Concepts
- Routine Creation and Use
- Flow Control Statement
- Writing Blocks of Code
- Triggers
- Stored Routines, Triggers, and the Binary Log
- Table HANDLERS
- Prepared Statements

## Optimization and Performance

### Tuning

- Optimizing Your Database
- Table Partitioning
- Optimizing Queries
- The Use of Indexes to Support Queries
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- MySQL® Development Rev 2.1.2
- Thinking about JOIN Queries
- Query Sorts, Indexes, and Short-Circuiting
- INSERT, UPDATE, DELETE, and Table Locks
- Some General Optimizations
- Optimizations Specific to MyISAM
- Optimizations Specific to InnoDB