

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, perform administrative functions, learn about optimization and performance tuning, and explore various APIs. This course covers MySQL 5.0.

Course Objectives:

- Describe MySQL’s benefits and features.
- Configure the MySQL server.
- Perform database design and normalization.
- Work with the command-line mysql tool.
- Set up and manage data and data schemas in MySQL.
- Use SELECT to retrieve data from a database.
- Combine data from multiple sources.
- Utilize more complex SQL functionality
- Understand the MySQL storage engine types and their applicability.
- Use some of the more common MySQL standalone tools.
- Manage database resources and users.
- Write and call stored procedures.
- Optimize database storage for performance.
- Connect MySQL to external programming interfaces.

Audience: Application and web developers, or system administrators.

Prerequisites: Prior experience installing software and programming in any language, such as HTML, is recommended but not required.

Number of Days: 4 days

<p>1. Course Introduction Course Objectives Overview Suggested References</p> <p>2. Introduction to Database Concepts and MySQL Features of a Relational Database Where does SQL Fit in? Database Access Why MySQL? The History of MySQL</p>	<p>3. Installation, Configuration, and Upgrading MySQL Software MySQL Software Features Preparing to Install MySQL Available Client Software After the Download Configuring the Server Starting the Server The Initial User Accounts Verifying Server Operation Upgrading</p>
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- Copying a Database Between Architectures
- Environment Variables
- 4. 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
- 5. Using the mysql Command-Line Tool**
 - 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
- 6. 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
- 7. DML – Data Manipulation Language**
 - DDL & DML Overview
 - Data Values: Numbers
 - Data Values: Strings
 - Working with NULL Values
 - Bulk Loading of Data
 - Bulk Data Format
 - 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
- 8. 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
- 9. 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
- 10. 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
- 11. 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 and Hardware Limitations
 - InnoDB Shared Tablespace Configuration
 - InnoDB Per-Table Tablespaces
 - InnoDB Data Management
 - MEMORY and FEDERATED
 - MERGE and ARCHIVE
- 12. 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 Query Browser
 - MySQL Query Browser: Deeper
 - MySQL Administrator: Basic Operations
 - MySQL Administrator: Monitoring the Server and User Administration
 - Third Party Tools
- 13. Administering a Database and Users**
 - The Server-Side Programs
 - Starting the MySQL Server
 - Using SET for Server Options
 - Table Management
 - Server Log Files
 - mysqladmin
 - Backup and Restore
 - Miscellaneous Functions
 - User Account Management
 - Understanding User Privileges
 - User Account Rights Management
 - User Account Privileges
 - Managing Access to the Database Environment
- 14. 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
- 15. Optimization and Performance Tuning**
 - Hardware Limitations
 - Optimizing the MySQL Server's Interaction with the External World
 - Adjusting the MySQL Server Configuration
 - Optimizing Your Database
 - Optimizing Queries
 - The Use of Indexes to Support Queries
 - 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

- 16. MySQL Programming Interfaces**
 - Database Application Architectures
 - Connecting MySQL to ODBC
 - Connecting MySQL to MS/Office and MS/Access
 - Connecting to MySQL from Perl
 - Programming Perl to MySQL
 - Connecting to MySQL from PHP
 - Programming PHP to MySQL