



## Course Overview

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### Course Details

**Course Name:** MySQL Mastery: From Database Basics to Advanced Queries

**Instructor:** Jane Smith

**Created On:** 16 June, 2025

**Updated On:** 16 June, 2025

**Price:** 4000 INR

**Duration:** 4 Weeks

**Modules:** 11

**Language:** English, Hindi

**Level:** Beginner, Expert

**Certifications:** Yes

## Course Description

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This hands-on MySQL course equips you with the essential skills to design, manage, and optimize relational databases. Whether you're a complete beginner or a developer looking to strengthen your backend foundation, this course guides you from the very basics of what a database is, DBMS, and RDBMS, to advanced querying and performance tuning, making you proficient in handling data for dynamic web applications.

You'll start with fundamental concepts like tables, columns, data types, and real-world database examples. We then move into practical SQL Data Definition Language (DDL) for schema creation, followed by an exhaustive exploration of SQL Data Manipulation Language

(DML). You will master everything from basic `SELECT`, `INSERT`, `UPDATE`, `DELETE` operations to advanced filtering (`WHERE`), sorting (`ORDER BY`), aggregate functions (`COUNT`, `SUM`), pattern matching (`LIKE`), and handling `NULL` values.

The curriculum then focuses on joining multiple tables using `INNER`, `LEFT`, `RIGHT`, `CROSS`, and `SELF JOINS`, understanding how to combine data from different sources. You'll also learn complex SQL features like `UNION`, `GROUP BY` with `HAVING`, `EXISTS`, `ANY`, `ALL`, and `CASE` statements.

Advanced topics include normalization for robust schema design, creating views, writing stored procedures and stored functions, implementing triggers, and scheduling events. A significant portion is dedicated to Query Optimization, including Indexes, `EXPLAIN` analysis, Slow Query Logs, and Optimizer Hints. You'll also gain deep insights into Transactions with ACID principles and Database Locking mechanisms. Finally, we'll cover advanced User Management, essential security practices, and an introduction to Database Replication for high availability, preparing you for enterprise-level challenges.

## What You'll Learn:

- Fundamental database concepts: DBMS, RDBMS, tables, columns, rows, and data types with real-world examples.
- Installing and setting up MySQL.
- Designing robust database schemas, choosing data types, and creating/modifying tables using DDL.
- Mastering extensive SQL DML operations: SELECT, INSERT, UPDATE, DELETE, WHERE, AND, OR, NOT, ORDER BY, LIMIT, MIN, MAX, COUNT, AVG, SUM, LIKE, Wildcards, IN, BETWEEN, Aliases, UNION, GROUP BY, HAVING, EXISTS, ANY, ALL, INSERT SELECT, CASE, Null Functions, Comments, Operators.
- Performing complex queries by joining multiple tables: INNER JOIN, LEFT JOIN, RIGHT JOIN, CROSS JOIN, Self Join.
- Implementing advanced database objects: Stored Procedures, Stored Functions, Triggers, Views, and Events.
- Comprehensive Query Optimization: Understanding Indexes, using EXPLAIN, analyzing Slow Query Logs, and applying Optimizer Hints.
- Ensuring data integrity with Transactions and ACID properties, and understanding Database Locks (Table, Row, Metadata).
- Managing User Roles, Permissions, and advanced MySQL Security.
- Strategies for database backup, restore, and maintenance.

- Introduction to Database Replication (Master-Slave, GTID, Group Replication) for scalability and high availability.

## Who Is This Course For?

This course is ideal for aspiring web developers (front-end or full-stack), backend engineers, data analysts, and anyone who wants to understand how to design, manage, and interact with relational databases effectively using MySQL. If you're building dynamic web applications or working with data, this course is a perfect fit.

## Prerequisites:

- **Basic Computer Literacy:** Familiarity with using a computer and navigating file systems.
- **A Computer/Laptop:** You'll need a working computer (Windows, macOS, or Linux) to install MySQL and practice.
- **A Willingness to Learn:** Your enthusiasm to master database concepts is the most important prerequisite!

Includes a real-world capstone project to apply all learned skills and a certificate of completion. Available in English and Hindi.

## Course Curriculum Details

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### Module 1: Module 1: Database Fundamentals & Setup

9 Lessons

1. 1. What is a Database? Role and Purpose **15min**

2. 2. DBMS vs. RDBMS: Understanding the Differences **20min**

3. 3. Introduction to MySQL: Features and Popularity **15min**

4. 4. Key Database Concepts: Table, Column (Field), Row (Record), Primary Key (Conceptual) **25min**

5. 5. Understanding Data Types (Conceptual overview) **15min**

6. 6. Real-time Database Examples and Their Usage (e.g., E-commerce, Social Media) **20min**

7. 7. Installing MySQL Server and MySQL Workbench/CLI **30min**

8. 8. Creating Your First Database and Selecting It **15min**

9. 9. Recap & Practical Task: Set Up Your MySQL Environment and Document a Real-World DB Example **40min**

## Module 2: Module 2: Basic Schema Design & Data Definition Language (DDL)

**10 Lessons**

1. 10. Designing Tables: Naming Conventions and Column Planning **25min**

2. 11. Choosing the Right Data Types (Practical application) **30min**

3. 12. Creating Tables with `CREATE TABLE` (Basic Syntax) **25min**

4. 13. Column Constraints: `NOT NULL`, `UNIQUE`, `DEFAULT`, `AUTO_INCREMENT` **30min**

5. 14. Primary Keys and Auto-Incrementing IDs (Detailed) **25min**

6. 15. Foreign Keys for Establishing Relationships (`REFERENCES`) **35min**

7. 16. Modifying Tables: `ALTER TABLE` (ADD/DROP/MODIFY COLUMN) **30min**

8. 17. Renaming and Truncating Tables **15min**

9. 18. Dropping Tables and Databases: `DROP TABLE`, `DROP DATABASE` **20min**

10. 19. Recap & Practical Task: Design and Implement a Small Database Schema **1hr**

## Module 3: Module 3: Core SQL Operations: Data Manipulation Language (DML) & Basic Queries

**26 Lessons**

1. 20. Understanding SQL: The Language of Databases **15min**

2. 21. `INSERT INTO`: Adding New Rows to a Table **25min**

3. 22. `SELECT`: Retrieving Data from Tables (Basic `SELECT \*`, `SELECT column\_name`) **25min**

4. 23. `WHERE` Clause: Filtering Data with Conditions **25min**

5. 24. Logical Operators: `AND`, `OR`, `NOT` in `WHERE` Clause **20min**

6. 25. `ORDER BY`: Sorting Query Results (ASC, DESC) **20min**

7. 26. `UPDATE`: Modifying Existing Data in a Table **25min**

8. 27. `DELETE FROM`: Removing Rows from a Table **20min**

9. 28. Handling `NULL` Values: `IS NULL`, `IS NOT NULL` **15min**

10. 29. `LIMIT`: Restricting the Number of Rows Returned (for Pagination) **20min**

11. 30. Aggregate Functions: `MIN()` and `MAX()` **15min**

12. 31. Aggregate Functions: `COUNT()`, `AVG()`, `SUM()` **20min**

13. 32. `LIKE` Operator and SQL Wildcards (`%`, `\_`) for Pattern Matching **25min**

14. 33. `IN` Operator: Matching Values in a List **15min**

15. 34. `BETWEEN` Operator: Filtering within a Range **15min**

16. 35. `AS`: Using Aliases for Columns and Tables **15min**

17. 36. `GROUP BY`: Grouping Rows for Aggregate Functions **25min**

18. 37. `HAVING` Clause: Filtering Groups **20min**

19. 38. `EXISTS` Operator **15min**

20. 39. `ANY` and `ALL` Operators **20min**

21. 40. `INSERT INTO SELECT`: Copying Data Between Tables **20min**

22. 41. `CASE` Statement: Conditional Logic in Queries **25min**

23. 42. MySQL Null Functions (`IFNULL`, `COALESCE`, `NULLIF`) **20min**

24. 43. SQL Comments **8min**

25. 44. SQL Operators (Review and Advanced Usage) **15min**

26. 45. Recap & Practical Task: Master Single-Table Queries and Filtering **1hr 30min**

## Module 4: Module 4: Joining Tables for Relational Data

**8 Lessons**

1. 46. Understanding Relational Concepts: Primary & Foreign Keys (Reinforced) **20min**

2. 47. Why Use JOINS? Combining Data from Multiple Tables **20min**

3. 48. `INNER JOIN`: Retrieving Matching Rows **30min**

4. 49. `LEFT JOIN`: Including All Rows from the Left Table **25min**

5. 50. `RIGHT JOIN`: Including All Rows from the Right Table **25min**

6. 51. `FULL OUTER JOIN` (Simulated in MySQL) and `CROSS JOIN` **25min**

7. 52. `SELF JOIN`: Joining a Table to Itself **20min**

8. 53. Recap & Practical Task: Perform Complex Multi-Table Queries using Various JOINS **1hr**

## Module 5: Module 5: Advanced SQL Objects & Automation

**6 Lessons**

1. 54. Creating and Using Views for Simplified Queries **25min**

2. 55. Stored Procedures: Writing Reusable SQL Code Blocks **35min**

3. 56. Stored Functions: Custom Functions for SQL Queries **30min**

4. 57. Implementing Triggers for Automated Database Actions **30min**

5. 58. Scheduling Database Tasks with Events **25min**

6. 59. Recap & Practical Task: Create Views, Stored Procedures, Functions, Triggers, and Events for a Business Scenario **1hr 30min**

## Module 6: Module 6: Database Design & Normalization

**5 Lessons**

1. 60. Understanding Normal Forms (1NF, 2NF, 3NF): Principles of Good Design **30min**

2. 61. Denormalization: When and Why to Deviate from Normal Forms **20min**

3. 62. Creating Entity-Relationship (ER) Diagrams: Visualizing Relationships **30min**

4. 63. Database Schema Best Practices for Scalability and Maintainability **25min**

5. 64. Recap & Practical Task: Design a Normalized Database Schema for a New Project **1hr**

## Module 7: Module 7: Query Optimization & Indexing

**8 Lessons**

1. 65. Introduction to Indexes: How They Work and Improve Performance **30min**

2. 66. Creating and Managing Different Types of Indexes (B-Tree, Hash) **35min**

3. 67. Using the `EXPLAIN` Statement for Query Analysis and Optimization **40min**

4. 68. Analyzing the Slow Query Log **25min**

5. 69. Applying Optimizer Hints for Specific Query Behavior **25min**

6. 70. Common Query Pitfalls and How to Avoid Them **25min**

7. 71. Best Practices for Writing Efficient and Optimized Queries **30min**

8. 72. Recap & Practical Task: Optimize a Slow Query in a Sample Database **1hr  
15min**

## Module 8: Module 8: Transactions, Data Integrity & Locks

**9 Lessons**

1. 73. Introduction to Transactions: Ensuring Atomicity and Reliability **20min**

2. 74. `START TRANSACTION`, `COMMIT`, and `ROLLBACK` Commands **25min**

3. 75. Understanding ACID Properties (Atomicity, Consistency, Isolation, Durability) **25min**

4. 76. Transaction Isolation Levels (Conceptual Overview) **15min**

5. 77. Introduction to Database Locks: Why They Are Needed **20min**

6. 78. Table-Level Locks (Conceptual) **15min**

7. 79. Row-Level Locks (Conceptual) **15min**

8. 80. Metadata Locks (Conceptual) **10min**

9. 81. Recap & Practical Task: Implement Transactions and Observe Locking Behavior  
**50min**

## Module 9: Module 9: MySQL Administration & Security

**5 Lessons**

1. 82. Managing User Accounts and Permissions (`CREATE USER`, `GRANT`,  
`REVOKE`) **30min**

2. 83. Securing Your MySQL Server (Root Password, Remote Access, etc.) **25min**

3. 84. Database Backup and Restore Strategies (`mysqldump`, MySQL Workbench)  
**30min**

4. 85. Basic Database Maintenance (Optimization, Repair, Check) **20min**

5. 86. Recap & Practical Task: Create a New User and Perform a Database Backup  
**45min**

## Module 10: Module 10: Database Replication & High Availability

**6 Lessons**

1. 87. Introduction to Database Replication: Why Replicate? **25min**

2. 88. Master-Slave Replication: Concepts and Basic Setup (Conceptual) **35min**

3. 89. Global Transaction Identifiers (GTID) Replication (Overview) **25min**

4. 90. MySQL Group Replication (Overview) **25min**

5. 91. High Availability (HA) Concepts and Solutions (Conceptual) **20min**

6. 92. Recap & Practical Task: Design a Simple Replication Topology **40min**

## **Module 11: Module 11: Capstone Project: Design & Implement a Complete Database**

**6 Lessons**

1. 93. Project Overview: Designing a Database Schema for a Web Application **1hr**

2. 94. Implementing Database Schema with SQL DDL Commands **1hr 30min**

3. 95. Populating Data and Performing Complex Queries (CRUD, JOINS, Functions)  
**2hr**

4. 96. Implementing Stored Procedures, Views, and Triggers for Specific Tasks **1hr**

5. 97. Final Review, Optimization Tips, and Course Conclusion **45min**

6. 98. Recap & Project Submission **30min**

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*This curriculum is subject to minor adjustments to ensure the most up-to-date and effective learning experience.*