DBMS

(MySQL)

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Address :- F-122, Atalanta Shopping Mall, Althan Canal Road, Althan, Surat.

DBMS Online Weekend Batch – Course Overview

Introduction

This course is designed to provide learners with a strong foundation in **Database Management Systems (DBMS)** using **MySQL.**

It covers both **theoretical concepts** (E-R modelling, normalization, constraints) and **practical skills** (writing queries, joins, functions, transactions, stored procedures, triggers, indexing, and optimization).

The program balances **hands-on practice** with real-world use cases, preparing learners for both **academic growth** and **industry-level applications.**

Course Objectives

By the end of this course, learners will be able to:

1. Understand the role of DBMS in software systems and its advantages over file systems.

2. Design relational databases using **E-R modelling and normalization** techniques.

3. Apply **SQL commands (DDL, DML, DQL, TCL, DCL)** to create and manage databases.

4. Use **data types, constraints, and keys** to ensure data integrity.

5. Write efficient queries with **joins, subqueries, and functions** (string, numeric, date/time).

6. Implement advanced queries using **CTEs, temporary tables, views, JSON functions, and window functions**.

7. Manage transactions and control access using **TCL and DCL commands.**

8. Develop and optimize **stored procedures, triggers, cursors, and indexes.**

9. Analyze performance with **query execution plans** and apply indexing for optimization.

10. Work on **real-world mini projects**, gaining confidence for interviews and professional applications.

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Day	Topics	Hands-on / Outcome
1	**Introduction to DBMS & Setup** • What is DBMS & Why • File System vs DBMS • MySQL vs Workbench • CLI vs Workbench • Installation & Setup	Create & connect to DB using CLI & Workbench
2	**Database Design** • E-R Model (Entities, Attributes, Relationships) • Keys (Primary, Foreign, Candidate, Composite, Super) • Normalization (1NF–3NF, BCNF)	Design schema for a simple system
3	**DDL & Data Types** • CREATE/DROP DATABASE & TABLE • **MySQL Data Types**: Numeric, Date/Time, String, BLOB, ENUM, SET	Create tables with all data types
4	**DML, DQL & Constraints (Part 1)** • INSERT, SELECT (basic) • NULL handling, Aliasing • Constraints: NOT NULL, DEFAULT, UNIQUE, PRIMARY KEY • **Flow of Query Execution**	Insert/retrieve data with constraints
5	**Functions in MySQL (Part 1 – String & Numeric)** • String: CONCAT, SUBSTRING, UPPER/LOWER, LENGTH, TRIM, REPLACE, INSTR • Numeric: ROUND, CEIL, FLOOR, MOD, ABS, POWER, RAND	Queries using string & numeric functions
6	**Functions in MySQL (Part 2 – Date/Time)** • NOW, CURDATE, CURTIME • DATE_ADD, DATE_SUB, DATEDIFF, TIMESTAMPDIFF	Queries using date/time functions

	• EXTRACT, DAYNAME, MONTHNAME • Formatting dates/times	
7	**Constraints (Part 2) & Filtering** • FOREIGN KEY (ON DELETE/ON UPDATE) • CHECK constraint • Composite Keys • WHERE Clause (>, <, BETWEEN, IN, LIKE, IS NULL)	Apply constraints, filtering queries
8	**ALTER & DML Ops** • ALTER TABLE (Add/Drop/Rename/Modify) • Manage Constraints • UPDATE, DELETE • Operators (AND, OR, NOT) • TRUNCATE vs DELETE vs DROP	Modify tables & data
9	**Keys & Auto Increment** • AUTO_INCREMENT • Candidate & Super Keys • Altering Keys	Add keys to existing tables
10	**Joins & Subqueries** • INNER, LEFT, RIGHT, FULL (via UNION) • CROSS JOIN, SELF JOIN • Multi-table Joins • Subqueries: Single-row, Multi-row, Correlated	Join queries & subquery tasks
11	**Advanced Queries** • Combining Joins + Subqueries • CTEs (WITH, Recursive) • Temporary Tables vs Views • JSON Data Type + Functions • **Window Functions**: ROW_NUMBER, RANK, DENSE_RANK, LEAD, LAG, NTILE, SUM/AVG OVER	Write queries using CTE, Views, JSON, Window Functions
12	**Transactions & Access Control** • TCL: COMMIT, ROLLBACK, SAVEPOINT • ACID Properties	Simulate transactions, user roles & permissions

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	• DCL: GRANT, REVOKE, CREATE USER • Import/Export using Workbench UI	
13	**Stored Procedures & Advanced Concepts** • Stored Procedures & Functions (IN, OUT, INOUT) • Enhancements: IF, CASE, Error Handling (DECLARE HANDLER) • TRIGGERS (Before/After) • CURSORS • INDEXES (Single, Composite, Covering, Full-text) • **Advanced Indexing** & Execution Plans (EXPLAIN)	Create procedures, triggers, indexes; analyze query plans
14	**Final Project & Wrap-Up** • Mini Project (E-commerce/Student DB) • Query optimization tips • Full course revision • Interview prep (common DBMS questions) • Certification distribution	Complete project + revision

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