Syllabus - Beginner to Expert

🎓 SQL Syllabus – Beginner to Expert

🟢 Level 1: Introduction & Basics

Objective: Understand databases, tables, and basic data manipulation.

Week/Module	Topics
1.1	What is a Database and SQL? Types of Databases (Relational vs. NoSQL)
1.2	Creating & Using a Database (`CREATE DATABASE` , `USE`)
1.3	Creating Tables (`CREATE TABLE`) with Data Types (`INT` , `VARCHAR` , `DATE` , etc.)
1.4	Inserting Data (`INSERT INTO`)
1.5	Retrieving Data (`SELECT` , `SELECT *` , `SELECT column_name`)
1.6	Filtering Data (`WHERE` , comparison operators)
1.7	Sorting Results (`ORDER BY ASC/DESC`)
1.8	Limiting Results (`LIMIT`)

🟡 Level 2: Intermediate Queries & Functions

Objective: Learn to update, delete, and summarize data.

Week/Module	Topics

2.1	Updating Data (`UPDATE`)
2.2	Deleting Data (`DELETE`)
2.3	SQL Functions: `COUNT()` , `SUM()` , `AVG()` , `MIN()` , `MAX()`
2.4	Grouping Data (`GROUP BY`)
2.5	Filtering Groups (`HAVING`)
2.6	Pattern Matching (`LIKE` , `%` , `_`)
2.7	Logical Operators (`AND` , `OR` , `NOT` , `IN` , `BETWEEN`)
2.8	Aliases (`AS`) and Column Renaming

🔵 Level 3: Relationships and Joins

Objective: Understand table relationships and retrieve data from multiple tables.

Week/Module	Topics
3.1	Primary Keys, Foreign Keys
3.2	INNER JOIN
3.3	LEFT JOIN
3.4	RIGHT JOIN
3.5	FULL OUTER JOIN (conceptual; not directly supported in MySQL)
3.6	Self Join
3.7	Using `ON` vs `USING`
3.8	Cross Join & Cartesian Product

🟠 Level 4: Advanced SQL Techniques

Objective: Perform complex queries, subqueries, and use set operations.

Week/Module	Topics
4.1	Subqueries (Scalar, Column, Row, Table subqueries)
4.2	Correlated Subqueries
4.3	`EXISTS`, `NOT EXISTS`
4.4	Set Operations: `UNION`, `UNION ALL`, `INTERSECT`, `EXCEPT`
4.5	CASE Statements and Conditional Logic
4.6	Derived Tables (Inline Views)
4.7	Views: `CREATE VIEW`, `ALTER VIEW`, `DROP VIEW`
4.8	Window Functions (if using MySQL 8+): `ROW_NUMBER()`, `RANK()`, `OVER(PARTITION BY)`

🔴 **Level 5: Schema Design & Optimization**

Objective: Understand schema design, constraints, indexing, and performance.

Week/Module	Topics
5.1	Constraints: `NOT NULL`, `UNIQUE`, `DEFAULT`, `CHECK`, `AUTO_INCREMENT`
5.2	Composite Keys & Surrogate Keys
5.3	Indexes: `CREATE INDEX`, `DROP INDEX`, pros/cons

5.4	Transaction Control: `BEGIN`, `COMMIT`, `ROLLBACK`, `SAVEPOINT`
5.5	Isolation Levels (Read Uncommitted to Serializable)
5.6	Stored Procedures (Intro only)
5.7	Triggers (Intro only)
5.8	Query Optimization Basics (EXPLAIN, execution plans)

📘 **Optional Topics (For Advanced Learners)**

- JSON support in MySQL
- Full-text search
- CTEs (Common Table Expressions)
- Temporal tables
- Partitioning

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