

# POSTGRESQL SYLLABUS

## Module 1: Introduction to PostgreSQL

- What is PostgreSQL and its features
- PostgreSQL vs MySQL
- Installing PostgreSQL & pgAdmin
- Overview of PostgreSQL architecture

## Module 2: Database Fundamentals

- Databases, schemas, tables
- Data types (numeric, text, date, JSON)
- Constraints (PRIMARY KEY, UNIQUE, NOT NULL, CHECK)
- Creating and managing tables

## Module 3: SQL Basics

- Introduction to SQL
- DDL (CREATE, ALTER, DROP)
- DML (INSERT, UPDATE, DELETE)
- DQL (SELECT)
- Filtering data (WHERE clause)

## Module 4: Sorting & Aggregation

- ORDER BY
- GROUP BY
- HAVING clause
- Aggregate functions (COUNT, SUM, AVG, MAX, MIN)

## Module 5: Joins

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL OUTER JOIN
- SELF JOIN

## Module 6: Subqueries

- Nested queries
- Correlated subqueries
- Using subqueries in SELECT and WHERE

## Module 7: Indexes

- Types of indexes (B-tree, Hash, GIN, GiST)
- Creating and managing indexes
- Performance benefits

## Module 8: Views

- Creating views
- Materialized views
- Updating views

## Module 9: Functions & Stored Procedures

- Creating functions
- Stored procedures
- Parameters and return types
- Exception handling

## Module 10: Triggers

- What are triggers
- BEFORE and AFTER triggers
- Row-level vs statement-level
- Practical use cases

## Module 11: Transactions

- ACID properties
- COMMIT, ROLLBACK
- SAVEPOINT
- Isolation levels

## Module 12: JSON & Advanced Data Types

- JSON and JSONB
- Working with arrays
- Full-text search basics

## Module 13: Security & User Management

- Roles and permissions
- Granting and revoking access
- Authentication methods
- Data security

## Module 14: Backup & Restore

- Backup strategies
- pg\_dump and pg\_restore
- Recovery techniques

## Module 15: Performance Optimization

- Query optimization
- Execution plans
- Index tuning
- Monitoring performance

## Module 16: PostgreSQL with Applications

- Connecting PostgreSQL with Node.js
- Using PostgreSQL with Django
- CRUD operations in applications

## Module 17: Real-World Projects

- E-commerce database
- Blog system
- Inventory management
- Analytics database